



VOL. 44, No. 11

NOVEMBER 1976

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COVER PHOTO

Bill Rice VK3ABP, leader of the recent DXpedition to Lake Eyre (his second), plays "Sinbad" on the shores of the lake, with the star of the expedition, the "Red Baron" in the background.



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Receiver Sensitivity: 0.7 uV at 10 dB S/N
Selectivity: 45 dB at ± 10 kHz
IF Frequency: 455 kHz
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amateur radio

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QSP CB - BE PREPARED

As you are all well aware, numerous items concerning "CB" have been appearing with increasing frequency in the daily press, the popular monthly magazines, and also on television.

Let's take a look at the situation.

There are already in Australia a large number of people who have (and can use) transmitting equipment of their own. This equipment has been, and still is, freely available to anyone wishing to buy it. It is reasonably cheap and works well.

Some estimates put the number in Australia as up to 200,000.

We are faced with ordinary people who wish to use an instrument, about which they have no technical knowledge, as a means of personal communications enabling them to talk freely to other people miles away.

We know that many people would use "CB" innocently, wisely and with decorum. However, it is human nature that there will be some people who will unhesitatingly use "CB" for their own legal and illegal purposes. Yet others will embrace "CB" for the thrills of longer and greater DX contacts, whether permitted or not.

Others again will use "CB" because they are "frustrated amateurs", or have no time or inclination to study for examinations.

The introduction of a legal, short range, personal communications facility (CB) is a concept entirely new to Australia, requiring approval at a government level. The major consideration affecting the introduction of any new facility is the ability of the administration to exercise complete and effective control. The WIA has no direct policy on the principle of a short range personal communications facility (CB). However, there are very definite policies with regard to the use of Amateur bands by people who have taken the law into their own hands, and are operating their own personal communications facility.

I would like to emphasise that it is the function of the WIA to look after the interests of the licensed Amateur transmitter and those who aspire to obtain a licence. To this end, we must closely follow all developments that may affect our privileges now, and in the future.

DAVID WARDLAW VK3ADW
Federal President, WIA

QSP

DIVISIONAL SHORTS

For the benefit of short wave listeners in particular, here are brief details of Divisional broadcasts. All are on Sundays, unless otherwise stated, and times are local times; other frequencies are used in addition to those listed (especially VHF).

Division	Local time	Frequencies kHz ±
VK1	19.30	3595 27125
VK2	11.00	1825 3590 27125 3555
VK2: Hunter Branch:	(Mondays) 19.30	3595
VK3	10.30	1825 3500 7135 22.00h
VK4	09.00	1825 3580 7146 14342 27125
VK5	0.900	1815 3625 7125 14170
VK6	09.30	3600 7080 14100
VK7	09.30	3570 7130 (27125)

INTERFERENCE

An interference survey was conducted recently in the UK and a brief report was given in the July '76 issue of Radio Communication which could

have much relevance to Australian conditions. Some 1221 members completed and returned the questionnaire and the report sums up the results. "From the returns it is possible to formulate a picture of 'Mr. Average Amateur'. If he experiences any interference problems at all, he suffers about three cases of TVI (his own TV and two others?), a case of BC and two of AFI (AFI is unlikely to be the result of defects in his own station). He is not entirely convinced (as he should be) that interference can be cured, and he is too prone to fears (often unfounded) that limit his operation. Many of his cases are not reported — so the (official) statistics underestimate the problem to a considerable degree. This is fortunate for the complacency of the manufacturers, who continue to deny that any problem exists. With the growth of private radio services (including amateur) the problem can be expected to increase, and VHF. When one takes the trouble to find out what the channel numbers mean, one is staggered to find 25 kHz separation. Are the VHF signals really so broad that they really require 25 kHz? If it arises from the use of FM by the repeaters, then surely FM must be a most extravagant method of using our frequencies. Where would we be on 20 m if QSOs had to be 25 kHz apart? Surely, such a method must invite severe criticism and loss of frequencies at the 1979 WARC? G3BID writing in June '76 Mobile News.

VHF CHANNELS

"An outsider who has operated for decades on the HF and LF bands is really puzzled by the present VHF set-up. The habit of referring to 'channels' instead of frequencies is confusing to the newcomer to VHF. When one takes the trouble to find out what the channel numbers mean, one is staggered to find 25 kHz separation. Are the VHF signals really so broad that they really require 25 kHz? If it arises from the use of FM by the repeaters, then surely FM must be a most extravagant method of using our frequencies. Where would we be on 20 m if QSOs had to be 25 kHz apart? Surely, such a method must invite severe criticism and loss of frequencies at the 1979 WARC? G3BID writing in June '76 Mobile News.

WIANEWS

CB

The following joint statement is published for general information:

"An exploratory meeting was held on 27th September 1976 in Melbourne between members of the Executive of the Wireless Institute of Australia and the Australian Citizens Radio Movement, a group representative of those interested in the legislation of a citizens band. The Federal President explained the I.T.U., Radio Regulations and the Amateur Service which was international.

A wide-ranging discussion was then held in relation to the concepts involved, the aims of the service and the realities which must be faced. Stress was laid upon the need for a frequency band suitable to accommodate the equipment already in the country, but no specific frequencies were requested. Equal stress was laid upon the safety and emergency uses of such a service for private individuals. The problems experienced were aired and it was believed that a CB service nevertheless would eventuate in due course.

The Federal President thanked all those who attended."

POSTAL VOTE

Postal Motion 76.20.01 (No. 1/1976) was circulated to Federal Councillors in August and was passed. The Motion was detailed in WIANEWS in Oct. AR.

In simple terms this means there is now no Federal Y.R.C.S. organisation in existence other than via the Executive Office. Youth Radio Schemes will in future exist as units in each State and in many cases will remain under the control of the respective Divisional Council. Federal Y.R.C.S. Notes in AR will cease and presumably each Division will henceforward include Y.R.C.S. Notes of their own State in their own bulletin. A report will be made at the next Federal Convention on how the new system functions.

The Federal Education Officer is Mr. Graeme Scott, VK3ZR acting in accordance with Federal Convention Motion 76.093 to investigate and make recommendations on general radio instruction to candidates of all ages and to take into account the nature and levels of examinations and exemptions therefrom. This portfolio covers a big field of activity — much greater than may appear on first sight — and naturally includes Y.R.C.S.

An interesting development was a request received from Central Office for the assistance promised some years ago by the Institute relating to multi-choice examination questions for AOC and Regulations. As the result, a considerable number of questions and answers were duly prepared and submitted. It is understood that a similar request went out to other groups.

How far this indicates a switch to multi-choice for all amateur examinations remains to be seen. However it may indicate that the Institute's submissions relating to systems improvements in the R.F.M.D. have not fallen on stony ground — see WIANEWS in Sept. AR — but nevertheless it seems that replies to our many submissions, other than acknowledgements from the Division, are still as difficult to obtain as ever. Perhaps the blame really lies fairly and squarely on shortages of staff, coupled with the low priority believed to have been conferred upon amateur affairs.

Executive held two meetings during September, an ordinary one and a special one as already reported above.

SUBSCRIPTIONS

The Finance Sub-Committee 'met' during the month and agreed to recommend Executive to accept the 1976 Federal Convention Motion that the 1977 Federal due should be \$15.00 for full and associate members. This was accepted. This is only 50 cents above the 1976 level despite the ravages of inflation. The extra 50 cents is to be allocated against the Federal dues element; the AR and IARU elements remain unchanged. It was noted with approbation that some Divisions are already calling for an extra levy to help the I.T.U. Fund for WARC 79.

WARC 79

And on this subject the Agenda for WARC 79 has finally arrived and clause 1 in it advises the duration of the Conference as 10

weeks from 24.9.1979. 10 weeks is a very long time and will seem a lifetime when all the late night sessions are taken into account. 10 weeks in a place such as Geneva also promises to be a most expensive affair, quite apart from the loss of pay or earning capacity for anyone not attending on a 'holiday'. It would be no holiday.

A meeting of the Australian Preparatory Group (APG) was scheduled for 6th October having been postponed from June whilst awaiting the Agenda. Meanwhile work has been going forward preparing the W.I.A. submissions on the amateur service for Committee No. 2, but progress was slower than anticipated because of other pressing commitments says Dr. Wardlaw.

CALL BOOK 1977

At last sufficient information came through during September to justify work commencing on processing non-members into the Institute's EDP file in preparation for the next call book. Slight modifications to the programme will be required, but these can not be done for us before February next year. Since the non-member input work may take that length of time to complete anyway, and a month will have to be allowed to iron out any bugs in the system, it does not seem likely that the 1977 Call Book could appear much before June. This assumes a satisfactory conclusion to contractual negotiations with the R.F.M.D.

If all goes according to Hoyle, the WIA non-members will be identified with an asterisk against their names in the print-out for the call book. Furthermore, as we know from past experience their details are liable to contain considerable error, whereas the addresses, etc., of members will be much more accurate.

UHF AND UP

The VHF/UHF Advisory Committee (VHFAC, as it is called) spent some time considering EME and ATV repeater frequencies. Correspondence on EME was initiated with Lyle Patison VK2ALU, from whom the original submissions derived. The RFMD was asked to approve cross-band ATV repeaters, and correspondence was initiated with the New South Wales Division relating to their requirement for in-band 70cm ATV repeaters, since this raises a number of issues important to future operations on this band.

REPEATERS

No comments have come through from the RFMD about the 70cm band plan for 430-40 MHz and the 70 cm proposed repeater frequencies. In the same way there is no news about institute submissions relating to repeater conditions one of which was the very reasonable request that the WIA should be consulted before the grant of any 70cm repeater licences. If this is not done band plans are rendered useless and chaos could occur. This point was taken in discussions with the RFMD on 23rd August but may take time to implement.

Great pressures exist in the heaviest population area of Australia — namely New South Wales — for additional 2 metre repeater frequencies, and Executive noted the crystallisation thought in that State Division which would enable further work to begin when details come forward.

CUSTOMS

Further to the report on pages 3 and 4 of AR for Nov. '75 a press release during September advised the acceptance by Government (subject to international commitments — which are unlikely to affect amateur gear) of the IAC report of 9.4.1976 on Telecommunications Equipment. Paragraph 2.8 in that Report noted that some items of amateur radio equipment already enter under by-law. Remaining requests for duty free entry of specific items would be more appropriately dealt with through the by-law system, it said. The press release advised in relation to these that normal by-law criteria will continue to apply.

A disturbing report was recently received that general by-law concessions for 70cm amateur transceivers had been withdrawn as the result of objections by a local manufacturer. Nothing further has transpired on this.

WICEN FREQUENCIES

An objection was received to the proposal that 14100 kHz be specified as a WICEN net frequency because this is at the borderline between the CW and phone segments of the band.

CONTESTS

Executive considered a proposal that the VK/ZL/O Contest, in so

far as the WIA is concerned, should be terminated because of the limited interest in it, the work and the costs involved. It was agreed that no changes should be made.

CALCULATORS IN AMATEUR EXAMS

A letter from the Department advised that electronic calculators will be permitted in exams subject to certain conditions.

G6CJ AERIAL CIRCUS

Certain conditions were imposed when G6CJ agreed to the WIA making a videotape of his splendid lecture on aerials. As a result of this a set of conditions to be observed has now been drawn up for the loan of the edited videotape.

1976 REMEMBRANCE DAY CONTEST, OPENING ADDRESS BY THE RT. HON. MALCOLM FRASER, M.P., PRIME MINISTER OF AUSTRALIA

I am very pleased to be given this opportunity to open the Remembrance Day Contest for 1976 and in a small way assist with your tribute to those amateur radio operators who laid down their lives for Australia.

Since the Remembrance Day Contest is a friendly contest those who take part will be carrying on the tradition of amateur radio itself, making friends over the air and helping to develop international understanding through this remarkable leisure activity. A most fitting way of serving the memory of those whose names are inscribed on the Roll of Honour.

I am a little disappointed that amateur radio is not allowed in some countries, but I understand that most of you listening will be in regular contact over the air with amateurs in most countries of the world; your contacts provide a valuable addition to the goodwill and international understanding so badly needed in today's world.

Your administrators in amateur radio should continue to be on the alert to meet new challenges.

The achievements of amateur radio operators are considerable. They include technical advancements, instructional assistance to aspiring amateurs and to those starting their careers in electronics; demonstrations of using and commanding amateur satellites are just a few.

The communications originated by amateurs during the Guatemalan earthquakes and other disasters bear witness to their intrinsic value. Nearer home, the value of amateur communications during Cyclone Tracey, the Brisbane floods, bushfires and other emergencies are clearly recognised by emergency organisations and official bodies.

I commend this kind of community effort to all amateurs and hope every advantage will be taken of practice exercises, training sessions and other ways to maintain high standards.

With these few thoughts I am delighted to declare open the 1976 Remembrance Day Contest. ■

QSP

CONDEMNATION

"Amateur radio operators in Chicago's largest Amateur Radio club are taking a firm stand against Citizens Band radio operators and their use of jammy reports" and "convoys" to avoid highway radar installations. At a recent meeting the 350-member Chicago FM Club passed a resolution condemning the use of radio to "circumvent the traffic laws of our communities" and pledged not to use Amateur Radio for such purposes". Report in *Worldradio News*, July 1976.

GOING MICROWAVE?

The editorial in June '76 QST carries the following interesting information — "It seems to us that we amateurs need to make a good deal more use of the UHF and above. We have large chunks of spectrum up there that are being used by only a small number of hardy experimenters. What is needed is a more vigorous expansion into the higher reaches of the spectrum.

The upward move is inevitable. Two metres will soon be overloaded from one end and the band to the other, an overloading that has been enhanced by the massive growth of FM the past few years. The 220-MHz band is fast becoming overcrowded, particularly in the larger metropolitan areas. The same for 420. There is, literally, no space left in those three bands in many areas of North America.

This same situation exists in other radio services. It is obvious from what we learn during preparations for WARC-79 that other services would like spectrum space in or around 140-150 MHz, but the space just isn't available. There are a number of us who believe that the only real and long-term solution lies in a move to 300 MHz for a number of the mobile services. There's just no use in postponing the inevitable.

The same goes for the amateur service. Now is the time to head for 1215 and above. There's no sense in postponing the inevitable. The quicker we make the move, the quicker we'll take some of the pressure off our bands at 144 and 220 and 420, and the better we'll be able to justify our retention of our bands at 1215 and above".

INTERFERENCE

Here is a quote from the column of Dr. Theodore Cohen, W4UJF, in *Worldradio News* June '76:

"Discussions with Mr. Richard Smith, Federal Communications Commission, Washington, DC, indicate that the commission received 25,282 RFI complaints during the third quarter of fiscal 1976. This brings the total number of complaints for the fiscal year to date to 57,014, 2000 more than all of the complaints received in fiscal 1975.

Roughly 45,000 of the 57,014 complaints received by the commission involve electronic home-entertainment equipment, with 80 per cent of these complaints related to the operation of stations in the Citizens Radio Service. Amateur operations are involved in about 7 per cent of the complaints. The FCC is still projecting that it will receive about 77,000 complaints during fiscal 1976, which, if true, would represent a 40 per cent increase in complaints over those reported last year".

SLOW SCAN TV SPACE SHOTS

The NASA laboratory's amateur radio station has recently been transmitting exciting pictures to the amateur fraternity

CB

Needless to say, a considerable amount of time was taken up by the Executive in discussing the concept of a Citizens Band in Australia. These culminated in the meeting with ACRM at their request. A letter was earlier despatched to the Minister highlighting amateur interest in the 11 metre band and pointing out that if this band is withdrawn the Novice licensees would lose 68 per cent of the frequencies allocated to them. One last thought this month on CB. USA CB-ers are not legally permitted to contact stations outside the USA and the majority opinion seems to indicate the same ought to apply here. This view appears to coincide with that of the more enlightened proponents of CB. ■

around the world. Bruce VK3VF has forwarded two of N6V's slow scan TV pictures received at his QTH.

Photograph 1 shows a crater on the surface of Mars as seen from the VIKING 1 Lander. The triangular peaks on the right of the picture are reference data related to computer enhancement of the picture. A graduated contrast scale is visible at the bottom.

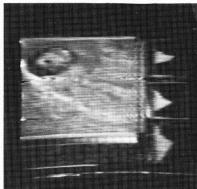


PHOTO No. 1

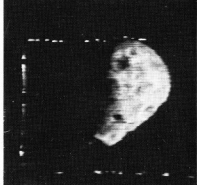


PHOTO No. 2

Photograph 2 is a view of Phobos, one of the moons of Mars. Phobos is only 17 miles in diameter. The photograph was taken by the Orbiter and has not been computer enhanced. It was transmitted via 20 metres only minutes after being received on Earth. Note the large lump that has been cleaved off the lower right side of Phobos. ■

MORE ON THE CW NET THE NCS

Frank Miller VK4II

The NCS (Net Control Station) is the heart of the CW Net. His task must seem to most net stations as superhuman. After all, the NCS must know at all times exactly where every station is, who the other station he is talking to is, who he has had QSOs with before, if he is temporarily or permanently out of the session, what frequencies are still available, etc., and all this for possibly 20 to 30 stations at a time.

The key to it all is the logging system. Without a very efficient and effective logging system, control of a large number of stations simultaneously is close to impossible. The system described in this article was suggested by the late VK2AV, Art Thurston, in the early days of the CW net. It proved to be excellent then and has not needed much modification since.

Essentially the system is simply the assignment of a separate line in the log to each station in the net. For 20 stations, there are 20 lines in the log. Each line is a diary item for that station. As each new station reports in, his call is entered on the next line and his call thus forms the title of that diary item. As each station has QSOs, his line starts to fill up with frequency, call, frequency, call, etc., forming an immediate record of the stations he works, and where he was, up to and including the current QSO. As each QSO is completed, a line is drawn through the station and frequency just completed.

The trick to the system is to realise that each station's record must be kept up to date at every moment. Once two stations are assigned a frequency, that information must be entered against both the stations. This takes a second or two and is the only delay in the procedure, though it is doubtful whether the net stations detect it. In practice, the log is so succinct and neat that the NCS can relax and can be quite sure of himself. Nothing is entered in the log which is not absolutely vital.

Experience has shown that a spacing of 3 kHz between stations is best, and 4 kHz above and below the NCS frequency should be left clear. To tell at a glance which frequencies are not in use cannot be immediately seen by scanning the log itself and so I write all the possible frequencies across the top of the page and put a mark under each one in use, crossing the mark off when the frequency becomes free. Other NCSs have arranged a set of cards, horizontally along a rod, each card corresponding to a frequency. As each frequency is assigned, the card is flipped over so that only the available frequencies are visible. Between 7003 and 7035 kHz are ten useable frequencies.

This serves adequately for most nets but can obviously be extended as required.

In scanning the log in the course of a session, the NCS needs only to scan the right hand end of the diary lines for crossed-out last QSOs, since QSOs still in progress are not yet crossed-out. Each line is the personal history of that station so it is essential that it be kept accurate. After a QSO, only one station might report back while the second station is tardy. In such a case, although the QSO is logged against both stations, only the station which has reported back should have his current QSO crossed-out. In this way, the fact that the other station is still out is obvious.

The rule is simple: *keep each station's record absolutely accurate at all times.*

Once the logging system is fully understood, it is an easy job to simulate it on the air by listening in to a CW Net session and pretending to be NCS. It takes only a few minutes to get the feel of it and to understand its subtleties. I leave a column free to the left of the log to register which stations are temporarily out of the net. If a station is out for the remainder of the session, I put a line through his call.

An example of part of a real net log is shown below. It represents a moment in time and can be followed through if it is remembered that each station is recorded in the order of reporting in and that adjacent stations are not necessarily paired together.

TYPICAL NCS LOG

	3	6	9	12	15	18	21	7025	29	32	35	38

CALL	1st QSO			2nd QSO			3rd QSO			4th QSO		
× 2SM	-06-2YK-											
3AJY	-32-2AFG-			21-2AW-			15-2LM					
× 2AW	-15-3JI			21-3AJY			06-2BF					
2AFG	-02-3AJY-			29-2BWC								
2YK	-06-2SM			18-2BH			06-2BF			18-3XU		
2RY	-12-6KQ			38-2BWG								
× 3JI	-15-2AW-											
5KQ	-12-2RY			12-2IV								
2AHR	-29-BWG			09-2AMO								
2BWC	-29-2AHR			29-2AFG			38-2RY			38-2ADB		

LOG SUMMARY

- 2SM completed a QSO and has temporarily left the session.
- 3AJY is in a QSO, his third.
- 2AW completed 3 QSOs and is out temporarily.
- 2AFG in a QSO.
- 2YK in his 4th QSO.
- 2RY waiting on frequency to be assigned another QSO.

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\$1000 - \$2000	\$1.50
\$2000 - \$5000	\$1.50
\$5000 - \$10000	\$1.50
\$10000 - \$20000	\$1.50
\$20000 - \$50000	\$1.50
\$50000 - \$100000	\$1.50
\$100000 - \$200000	\$1.50
\$200000 - \$500000	\$1.50
\$500000 - \$1000000	\$1.50
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\$1000000000000000000000000000000000000 - \$2000000000000000000000000000000000000	\$1.50
\$2000000000000000000000000000000000000 - \$5000000000000000000000000000000000000	\$1.50
\$5000000000000000000000000000000000000 - \$10000000000000000000000000000000000000	\$1.50
\$10000000000000000000000000000000000000 - \$20000000000000000000000000000000000000	\$1

A MORE VERSATILE STATION FREQUENCY COUNTER

If you have ever wanted to connect a digital frequency meter to your receiver to give received frequency readout, it becomes immediately obvious that with modern super-heterodyne types that this is not possible. There are at least three ways of overcoming this problem:—

- (1) If the receiver has a VFO range that starts at an exact multiple of 1 MHz (i.e. 5.0-5.5 MHz) then the frequency meter may be connected to the VFO and the true received frequency calculated in one's head.
- (2) The three generated frequencies of the receiver (HFO, VFO and BFO) may be heterodyned in a series of mixers and the actual received frequency selected by tuned circuits and amplified before reading with the frequency meter. This method requires switchable tuned circuits and peaking capacitors for each band and also the generated frequency may be leaked to the receiver if the mixing unit is not perfectly shielded.
- (3) The use of "up-down counters" provides a far better solution to the problems encountered in the second method. This involves the use of decade counters that will add or subtract frequencies digitally rather than by heterodyning and selecting with tuned circuits. The counter to be described uses this principle in that it "counts up" the HFO frequency then subtracts both the VFO and BFO frequencies, and displays the result which is of course the

D. J. McWilliam VK2ZDJ
The Winery, Yenda, N.S.W. 2681

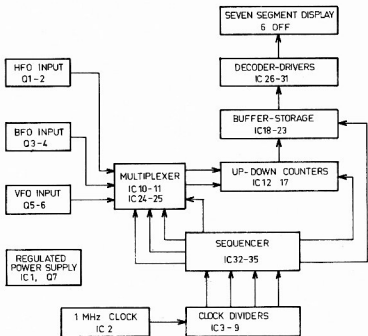


FIG. 1. BLOCK SCHEMATIC OF COUNTER

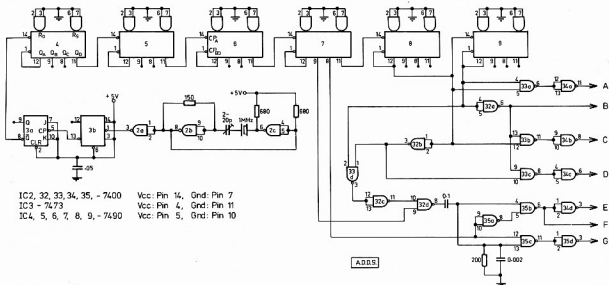


FIG. 2A. 1 MHz CLOCK DIVIDER CIRCUITRY AND SEQUENCER CIRCUITRY

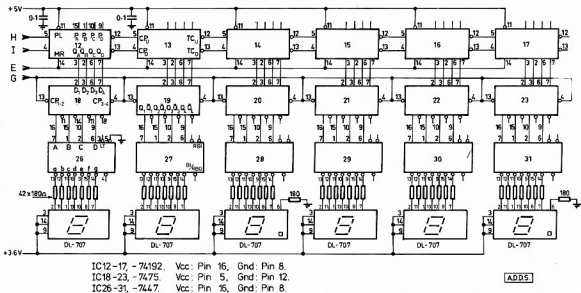


FIG. 2B. COUNTER AND DISPLAY CIRCUITRY

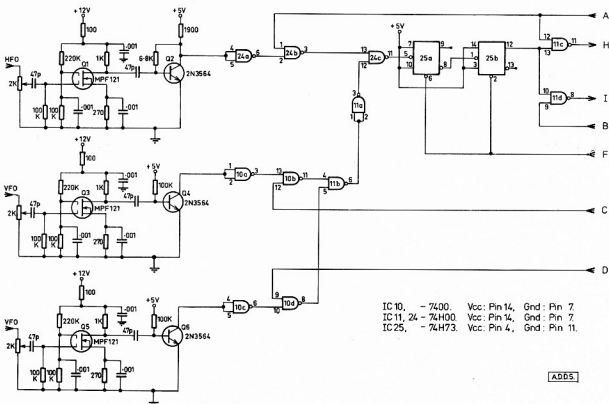


FIG. 2C. INPUT AND MULTIPLEXER CIRCUITRY



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CIR offers a complete range of options including fixed station console and external frequency synthesizer for crossband DX work. This extremely compact transceiver is only 2.8" high by 9.5" wide by 12.3" deep including heat sink. With all of these features plus all plug-in, rugged militarized type construction, it has no equal for SSB and CW operation.

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actual received frequency. For example, the receiver used in this station is a Hammarlund HQ215 which has a crystal locked HFO, a VFO range of 2.5-2.7 MHz and a BFO of 456.33 and 453.63 kHz depending on which side-band is required.

Hence for a received frequency of 14,200 MHz:—

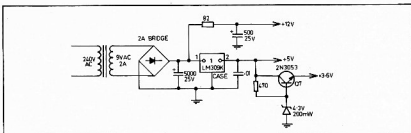
HFO (crystal locked) 17.155 MHz
VFO 2.500 MHz
BFO 0.455 MHz

Therefore, HFO-VFO-
BFO = 14,200 MHz

The sequence of operation is to count the HFO for 1/4 of the counting cycle then count down or subtract the VFO and BFO frequencies in the 2nd and 3rd quarter, then the final quarter initiates the display of the resultant frequency. The beauty of this counter is that by disconnecting the BFO and VFO inputs, the HFO input may be used to measure any frequency within the range of the counter which, by using, selected components, is about 35 MHz.

The construction of this counter is similar to those using the readily available SN7400 series ICs excepting for the timing and multiplexing circuits involved in selecting which frequency is to be counted.

Figure 1 illustrates a block schematic of how the counter works. The entire counter is constructed on double-sided fibre glass circuit board by firstly drilling all the IC pin holes and, after painting in the circuit with resistant paint, using a very fine brush (would you believe about 3 hours' work!). A separate board is used for the power supply module which provided the +10V and a 1 Amp 5V LM309K IC used for +5V regulated (see fig 2 (d)). Seven segment LED readouts are used and are mounted on a small piece of circuit board which is mounted behind the front panel. They are operated at a lower voltage than +5V to lessen the brilliance of the display — this is far easier than replacing the 42 dropping resistors. The readouts also have provision for decimal points. Six decade counters are used to give a readout to the nearest 100 cycles/Hz.



(NOTE: Mount IC1 on Heatsink) — FIG. 2D. POWER SUPPLY CIRCUITRY

CIRCUIT DETAILS

Most people will be familiar with how the counting and display circuit works, so no detailed descriptions will be given of these stages.

INPUT CIRCUIT

The three input circuits are practically identical excepting the biasing of transistor Q2 as can be seen in fig 2(c). An MPF121 dual gate mosfet is used at the input to provide amplification and a reasonably high input impedance which, in this case, is determined by the variable resistor across the input and earth used to adjust the input signal. Transistors Q2, Q4 and Q6 interface the output to digital logic levels.

CLOCK AND FREQUENCY DIVIDER

The clock oscillator is formed by IC2 and a 1 MHz crystal (see fig 2(a)). A trimming capacitor adjusts the crystal to exact frequency. The 1 MHz output is divided by IC3 through IC9 to give a 6.25 Hz frequency. Four timing outputs are used to operate various parts of the circuit. During one cycle (6.25 Hz) of duration 160 milliseconds, there are four periods each of 40 MS, and during each period a different frequency is counted and in the case of the fourth 40 MS period, the resultant received frequency is displayed.

SEQUENCER AND MULTIPLEXER CIRCUITS

The function of these circuits is to process the output logic of the clock frequency divider so that three input signals are

selected in the correct sequence and routed through the proper channel to the up/down counters. The three oscillator inputs are always present, but all are inhibited by gates during the fourth period. Only the proper signal is permitted entry to the counters during the other three time periods. The up/down counter has a limit of 10 MHz so IC 25 performs a divide by four function to bring the 10 meter band HFO crystals within this limit. This IC must be able to function at the highest HFO frequency, so a high speed or selected unit must be used. The circuits are shown in figs 2(a) and 2(b).

TRANSFER AND STORAGE

During the fourth 40 MS period, the storage latches and clear are activated. The timing circuit divides this period into two 20 MS periods. During the first 20 MS the latches transfer the count to the display, and during the second 20 MS period the counters are reset in preparation for the next counting cycle.

CONCLUDING REMARKS

The described counter has been successfully operating in the author's station for some months and it is a worthwhile accessory to any receiver.

A word of warning to any constructors — use molex pins for mounting the ICs. They don't require through contacts in the IC pin holes and one will be surprised just how many ICs won't work. The author found a total of 5 ICs which were in some way faulty.

N. C. Cooper VK4ZNC
8 Cahill St., Strathpine, Qld.

A BEACON MONITOR

PMG requirements state that unattended beacons should have a monitoring device to sense

- the loss of idet on the carrier
- permanent tone on the carrier

The monitor described below monitors these two functions plus four more. These being:

- low transmitter power
- high SWR
- early warning of low power
- battery charger fail

If any of these fault conditions appear except c & f, the monitor will shut down the transmitter. There are many ways one could come up with, of monitoring these

functions, but it is surprising how many of them do not work when tried. Perhaps a timer IC would work in place of the monostable in this monitor.

The unit was built on veroboard and mounted in the keyer box where space was available. The layout on the veroboard is not critical.

CIRCUIT DESCRIPTION

The heart of the monitor is the retriggerable monostable multivibrator type 9602. There are two in the one package and only one is used, so a 9601 would also be O.K. The device changes state when a trigger pulse is applied and stays in that state for a time determined by the values of CX and RX. In this case, this time has been set to about 30 seconds. Note

THE AT5 TRANSMITTER

T. O. Wooler
1 Glenrock Ave., Wahroonga, NSW, 2076

The AT5 transmitter and its companion receiver the AR8 were produced by AWA for Hudson and Catalina aircraft. This unit is available in Sydney for around 15 dollars at disposal stores and as such is an ideal start for a new Novice. It is already crystal locked and operational on 80m and without much alteration, could be made operational on 15m. All that would be necessary would be a receiver, which provides some scope for home construction. The following is useful information to get an AT5 operational on 160m, 80m, 40m, 20m; AM and CW with minimal expense.

BRIEF SPECIFICATIONS:

Weight: Transmitter 35 lbs; Aerial Coupling Unit 22 lbs; Power Supply 58-73 lbs.

Electrical: 12 or 24V DC Heaters; 550V DC at 160mA; 300V DC at 250mA.

OPERATION:

For medium frequency a Master Oscillator (VFO) is used providing a range of 140-500 kHz. On high frequency there is provision for both crystal locked and VFO operation, covering 2-5 MHz. Using doubling in the Buffer Amplifier (BA) and in the Power Amplifier (PA) total coverage is 2-20 MHz. Input to the finals (2 x 807) on CW is approx. 90 watts, AM and MCW 30 watts. Power output into a 100 ohm load is approximately 50 watts CW at the fundamental frequency and is somewhat reduced when doubling is used in the BA or PA. Three modes of transmission are possible: CW, MCW, and AM (R/T).

DETAILS:

Medium frequency operation.

The VFO used one 807 (V3) covering 140-500 kHz in four bands. This drives the PA (2 x 807; V4, V5). On MCW and AM, the PA is grid modulated by a 6V6-GT(VI). VI is a tone oscillator on MCW, also providing a side-tone on CW. Freq approx. 950 Hz; on AM it is a microphone amplifier. The MCW modulation varies between 40-80 per cent depending on carrier frequency.

High frequency operation

The H/F VFO uses a 6V6-GT(V2) covering 2-5 MHz in four bands. On H/F there is also provision for crystal locked operation using the same 6V6-GT for an oscillator. The signal then goes to an 807 (V3) operating as a BA or frequency doubler. This drives the PA (2 x 807; V4, V5), which can also be used as a frequency doubler. The PA is modulated by 6V6-GT(VI) in the MCW and AM modes. The modulation level may be increased by detuning the BA.

M/F H/F changeover

Two mechanically ganged switches S5 and S3 perform all the necessary changeovers.

Contacts are also provided for operation of a relay in the ACU to changeover antennae tuning circuits.

Keying

All valves are controlled including the modulator. The cathodes are passed to ground by 1M resistor R20, the key "shorts out" R20 thus closing the cathode return.

Metering

A meter is switched by S2 to monitor various currents to help in tuning up and to check operation of the set. Typical Currents:

H/F oscillator	xtal VFO	2-4mA 4-5mA
H/F BA w/out drive	with drive	45-50mA 25-35mA
H/F PA Grid 10-2MHz	Anode w/out drive	90-110mA 40-50mA
	at BA Freq	60-70mA
	2x BA Freq	60-70mA
Mod. Anode		25-35mA

Interwiring connections

All connections to the transmitter are made through the two outlet sockets on the front: as below—

Junction Box (Top)

Pin No.	Purpose
1	Keying relay connection
2	CW remote control
3	LT supply 26V neg
4	Sidetone output
5	Intercommunication microphone input
6	Remote control unit microphone
7	Pulse sender connection
8	RCU Send/Receive switch
9	Operator's microphone
10	Cathode return
11	RCU generator switch
12	M/F H/F relay

Power Supply (Bottom)

Pin No.	Purpose
1	LT supply 12V pos.
2	Earth
3	LT supply 26V neg. 12V neg.
4	LT supply 26V pos. 12V neg.
5	
6	
7	Earth
8	Generator starting relay
9	HT supply 550V pos.
10	HT supply 300V pos.

CONVERSION TO 160m

An AT5 was converted to 160m by the author and Sam VK2BVS and was used for the 160m broadcast relay in Sydney, Christmas 1975. The conversions themselves involved lowering the VFO range and lowering the BA and PA tuning range.

The VFO range 2-2.5MHz is controlled by coil L101 and trimmer C101 to lower the tuning range L101 is adjusted using the slug inside.

To lower the BA range extra capacitance across C210 was added; if AM operation only is desired, this is not necessary as the detuned BA increases the modulation level. Extra capacitance must also be added across C32 and PA tuning.

Anyone who requires more information should contact the author. I have schematic diagrams for AT5, AR8, Power supply unit, Aerial coupling unit, Relay test unit; as well as a complete interwiring diagram and ACU wiring diagram; service and instruction manual for AT5, AR8, PSU, ACU.

LETTERS TO THE EDITOR

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publishers.

The Editor,
Amateur Radio.
Dear Sir,

I was motivated to write this letter by the letter written by Roy VK3AOH in August's AR. In one section he advises against discriminating against the new Novice Licensees by the WIA. In this letter I do not wish to take up the cause of the Novice but that of the associate member of the Institute. Some might dismiss this letter as a disgruntled Associate but it was not written in that light. I do hope within the near future that I might have a call. Hence it would be easy not to say anything about the Associate's position but I will say what I feel needs to be said.

It would appear that an Associate is considered as a second class citizen compared to a full member (this assumes that other States work along the same lines as Victoria does). I say this because an Associate is ineligible to stand for, or even vote in the elections for the Local District Council. Yet associates make up just under 24 per cent of the members of the WIA (this assumes that the figure under 'Other WIA members' (AR July 76, p. 22) equals Associate members). From these figures no State has less than 19 per cent of its members as associates. Yet 24 per cent of the members of the WIA are unable to vote or have any real say in the running of their Institute. My contention is that Associate members should have the same rights as those experienced by Licensed members and hence be able to have a say in the running of the Institute.

The age old cry is that if we do this then we will be flooded with associates. If this is the case then I say great. Look at all these who are interested in our hobby. Yet I would doubt if such a change would cause an enormous influx of Associates or a takeover of the Institute by associate members.

In these days where there is a great emphasis on equal rights for all it seems both a pity and quite wrong that those who have not passed the "PMG Exam" either through lack of knowledge at the present, or no desire to sit the exam, or the inability to pass, should be discriminated against and be classed as second class citizens of our Institute. You might say all this is a bit rich and we never said it. In the long run it is not what you say that counts, but how you say it and then how you live it out.

R. A. Lenthall LS0482.

QSP 10 GHz BAND

In the Microwaves column of Sept. '76 Radio Communication, a new 10 GHz record was claimed of 521 km between G4ERS in Cornwall, England and G3MXJ/P in Scotland. The previous known record was between two W stations in 1950 over a 426 km path.

ELECTRONIC ENTHUSIASTS EMPORIUM

ITEMS OF INTEREST TO HOMEBREWERS. See current issue "Electronics Today International" for more detailed listing of components.

TRANSISTORS

BC107	.....	19
BC108	.....	19
BC109	.....	19
BFY50	.....	75
MPF102	.....	55
MPF103	.....	85
MPF104	.....	1.10
MPF105	.....	.65
MPF106	.....	6.0
MPF151/121	.....	1.30
2N706A	.....	.95
2N918	.....	1.60
2N2222A	.....	.95
2N2950	.....	.95
2N3638A	.....	.50
2N3642	.....	.45
2N3819	.....	1.25
2N5245	.....	.65
2N5590	7.75
2N5561	8.40
2N6004	17.50
40637A	4.60
40673	1.55
40841	1.85
MRFE603	7.90

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74574	1.80
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745196	5.95
740039
740439
747469
7469	3.90
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7412175
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LM558	2.75
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LM565	2.90
LM567	3.50
LM72395
LM74149
LM1498	1.80
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14 PIN39
16 PIN45
24 PIN78
40 PIN	1.25

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T-2575
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T-5085
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7100CAN	20
5200/6PLB	25
7300CAN	25
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BS105D85
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EM40420
EM40835
IN91410
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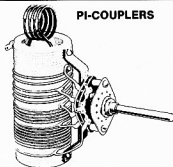
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THIS ADVERTISEMENT RECTIFIES AN ERROR ON PAGE 27 OF AMATEUR RADIO, OCTOBER, 1976

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- 7 Hunter Branch Field Day.
- 12 VK2 VHF Group conducts auction at W.C.
- 13/14 VK7 Div. Hamfest, Evandale Mem. Hall.

QSP

SSTV

From the "SSTV Scene" in Sept. '76 Radio Communication comes news of an SSTV reporting system devised by K6IIS and used by the MARS SSTV speciality network. R stands for readability and S for signal strength as in common use, with V for video quality in the scale—

- V5 Closed-circuit quality pictures
- V4 Good pictures with multi-path
- V3 Good pictures with interference
- V2 Readable pictures with multi-path and interference
- V1 Mostly unreadable, losses sync, pictures interrupted.

NEED A V56 QSL?

The Secretary of HARTS, V56GG, advises that there will be the Hong Kong activity day from 08.00Z on 13th November to 0.00Z on 14th November 1976 and several V56 stations will be very active on the bands both CW and phone (20m band especially) to give overseas amateurs a good opportunity of confirming a V56 contact.

FROM THE ARCHIVES

By Alan Powell,
son of A. L. Powell,

The photograph displays a spark transmitter built and operated by Mr. A. L. Powell back as early as 1908. To the best of our knowledge the photograph was taken by himself on about 1910.

We can recall him saying that the greatest difficulty in those days was to find someone to communicate with; but with the aid of a 70 ft. mast and a few illegal tricks he was able to talk with a few ships around the coast, and in good conditions one or two experimenters in and around Sydney.

At the outbreak of the 1914 First World War, all his equipment was confiscated by the Government and was never seen again; so a lot of time and ideas were wasted.

In the early twenties his talent came to the fore again with the coming of modulated broadcasting and he spent many a sleepless night experimenting in conjunction with Mr. Norman Culliver who operated 3 DP (3 Don PIP) from his Mont Albert shack.

At about this time he was also spending a great amount manufacturing and selling radio receivers from his Surrey Hills home.

We can remember the beginning of regular broadcasting by 3LO when Dame Nellie Melba was to give a recital. Great publicity was given to this event and Mr. Powell set up his amplifier speaker on the front verandah of his home. The night was wet and cold and the unmade streets were a mass of mud, but at least 50 people were puddling around out there, the impact was terrific and the result was orders for about 10 receivers.

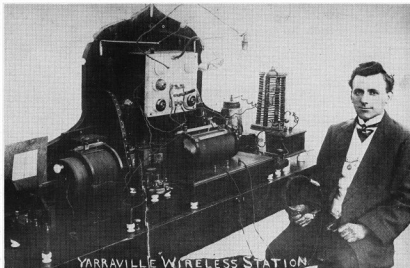
Later he redesigned his sets so as they were much more compact and placed one in the window of Louis Cohen's tobacco shop in the city. It was sold within the

hour, and as fast as they were replaced they were sold again.

Louis Cohen saw the great possibility in the industry and suggested setting him up and financing him on a permanent basis operating from a tin shed in North Melbourne. He gave this a lot of thought and rejected the offer.

Cohen not to be thwarted made a similar offer to another person who was dabbling in the business and so they got started. This was to develop into the giant radio corporation later to be known as Electronic Industries.

Mr. Powell was still making and improving his sets and to get more business he had leaflets printed and gave these to his brother who was an insurance agent to distribute. He did this by placing them in letter boxes while doing his round. I may mention that at the time anyone manufacturing radio sets had to pay a licence fee of 10 pounds per year. One of these leaflets was placed in the letter box of Mr. Jim Molone who at the time was the chief inspector of wireless. You can guess what happened.



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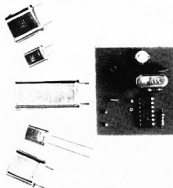
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	VK2WJ, Sydney	144,810
VK3	VK3RTG, Vermont	144,700
VK4	VK4RTL, Townsville	52,600
	VK4RTL, Mt. Mowbulla	144,400
VK5	VK5VF, Mt. Lofy	53,600
	VK5VF, Mt. Lofy	144,800
VK6	VK6RTV, Perth	52,300
	VK6RTV, Kalgoorlie	52,350
	VK6RTV, Albany	144,500
	VK6RTV, Perth	145,600
VK7	VK7RMT, Launceston	52,400
	VK7RTX, Devonport	144,900
	VK7RTV, Lonsdale	432,475
VK8	VK8VF, Darwin	52,200
3D	3D3AA, Suva, Fiji	52,500
HL	J01YAA, Japan	50,110
HL	HL9WJ, South Korea*	50,110
KG8	KG8JDX, Guam	50,110
KH6	KH6EQI, Hawaii	50,104
ZL1	ZL1VHF, Auckland	145,100
ZL2	ZL2MHF, Upper Hutt	28,170
	ZL2VHP, Palmerston North	52,500
	ZL2VHF, Wellington	145,200
	ZL2VHP, Palmerston North	145,250
	ZL2VHP, Palmerston North	431,850
ZL3	ZL3VHF, Christchurch	145,300
ZL4	ZL4VHF, Dunedin	145,400

News via "Break-In" mentions the reeling of the Auckland beacon, ZL1VHF on a range of hills to the south of Auckland. The polarisation is horizontal and the power output about 8 watts. Reports would be welcome.

Also from "Break-In" is a comment by the editor of The VHF Scene on a VHF Forum held at the recent NZART Convention in Auckland. . . . "Discussion mainly revolved around the limitations of channelised operation and the move away from general tuning of the two metre band. It was also noted that there was a poor turnout in the two metre section of the mobile rally. It was felt that although more people may have two metre capability now, the band was actually quieter than about six years ago. There would appear to be no easy answer, just education and the generating of enthusiasm. . . ."

The above rather confirms what I have thought for some time that channelised operation in New Zealand would probably closely follow the pattern in Australia. With the advent of a number of places of good commercial gear for two metres now, both in the transmitter and receiver field, there is more chance of seeing a continuation of the slow come-back to tuneable operation of the band, although it seems still the faithful few who keep the flag flying most of the time.

I suppose it is a case of what you see in amateur radio, and speaking personally, channelised operation has its place in my overall picture of operation, but the main interest is still using SSB or CW and I find it thrilling after all these years to work a station a very long distance with signals perhaps in and out of the noise.

With these thoughts at the back of my mind upgrading of two metre capability is always foremost in my mind, and currently the original winch-up tower has been realised closer to the shack to allow shorter feedlines, a stacked pair of 16-element yagis will be up about 80 feet, and mounted between them a 8 by 6 station slot antenna for the FM band. So we should be reasonably set up for two metres. I note also that Keith VK5SV is doing something similar, and with both stations running reasonable power, signals should be available further afield than previously.

I see from the Geelong Amateur Radio and TV

Club newsletter that Peter VK3YJP is operating from Shepparton each weekend, and is looking for contacts into Geelong and Melbourne areas each Sunday morning. Peter is using an IC202 to drive into a pair of 4CX2508s, with 400W PEP to a pair of yagis. It is noted Peter's signal into Geelong is over 5S.

Well, Peter, there are stations to the west of you and contacts from VKs are possible around 1030Z, so you might care to look this way from time to time.

Also from Geelong comes quite an interesting paragraph, and worth repeating: "With the large number of 'hand-bag' radios (IC202 etc.) in use, portable operation could be very popular this summer, particularly on 6 metres where the old bogey of TVI is ever present. However, most six metre operators get very few TVI complaints (if any) by using the band sensibly."

"Firstly, one must acknowledge that operation on this band will result in interference to TV channel 0, due to the closeness of Ch. 0's frequency allocation to the six metre band. Therefore, a responsible attitude has to be adopted; it is generally agreed by operators to use this band only during the day up to 1800 local as after this hour it is considered to be a peak viewing time. . . . Sunday afternoons are also a time when care should be exercised as Sunday sport is also very popular. Additionally, some form of attenuation of the transmitter output should be provided as the running of high power when the band is 'wide open' is completely unnecessary, any good QSOs have been made with a power output of 1 watt and less."

"As a lot of good openings occur during the daylight hours many contacts can be made without 'infringing too much with neighbours' viewing habits."

Well that all seems very sensible, and whilst the above is mainly for digestion of those living in Ch. 0 areas, it still has points for all of us, as strong signals on six metres can cause interference anywhere, particularly to audio equipment. It has been my experience to find that the introduction of colour TV receivers has not really caused the TVI problems envisaged, with their solid state construction. Possibly the widespread use of coaxial cable antenna installations has helped, but in many cases the front ends of both colour and black and white solid state TV sets are much more tolerant of strong signals than previously believed, which is probably just as well!

POINT OF INTEREST

On Thursday 2nd September, 1978, crossband contacts were made between VK6WG on 1296.8 MHz and VK6KZ/P on 146.0 MHz in Albany. Wally VK6WG was using a 3CX100A tripler amplitude modulated into a three foot parabolic dish. Wally VK6KZ used a ground plane antenna, diode mixer converter and a Barlow Wadley receiver.

The first path was a 2 km optical. On Monday 6/9/78 this path was lengthened to a 10 km non-optical path with VK6KZ/P using a converted 12 inch diameter aluminium reflector as the dish antenna. Interest in 1296 MHz in Albany may grow with Bernie VK6KJ an interested observer of these tests. . . . from VK6 VHF Newsletter.

What is probably of greater interest to VK5, VK3 and VK7 is the fact that 1296 MHz activity is starting in Albany. With suitable equipment at both ends there seems no reason why contacts should not be possible across the ocean into VK5, and probably further. Those well situated in the Adelaide plains like Garry VK5ZK, Peter VK5ZPS and so on, could well be the forefront in making the distance on that band.

I would also draw the attention of any who may be interested to an excellent six page article in the September 1978 issue of "QRN" from the Northern Branches of the WIA, Tasmania. It is entitled "A 144 MHz Linear Amplifier", by Greg VK2ZYT and is an article on all solid state equipment. It is an article on a 2N6550 from 1.5 watts drive, SSB, and going through various combinations of drive power and transistors to finish up with 50 to 55 watts of SSB with 2 watts input, and finishing up with an output stage only using two 2N6550s to deliver 50 watts from 10 to 12.5 watts drive.

There is a lot of good material for background in the article, together with parts list, circuit diagrams, layout etc. plus info on how to tune the beast. 50 watts into a ten element yagi at 50 feet will be heard a very long way.

EME REPORT
Via "The Propagator" Lyle VK3ALU reports: "We were advised by KJ3JZ of the W3CXG group, which had operated portable 432 EME in Columbia South America, in July-August, that they had experienced a number of power failures during the scheduled test periods. Unfortunately one of these had occurred during the scheduled test with VK3ALU. They were successful in working a number of other stations, some of whom made 432 MHz WAC with their contact with HK1TL."

"Our scheduled tests for August were carried out on 29/8. A transmitter power supply problem prevented contacts during the W test period in the morning but VK2ZEN heard W4XZ1, 'M' copy, while VK2ALU worked on the power supply, including removal of a mouse's nest!"

"During the evening a further group of tests were scheduled with stations in Europe. SML5E was not heard and was probably not on. Signals were heard during the F2U test period, but bad QRM from another French station, who was peaking to 10 over. . . . The moon set prior to the scheduled test period with LX1DB ham who provided the worldwide test schedules each month."

Tests were made on 29/8 for received signal strength emanations from the concentrated star mass at the centre of the Galaxy. This is a good reference signal level, as it is not subject to the small fluctuations in level as the emanations from the sun and is more comparable in strength to the lower level EME signals received from some stations."

A QSL card was received during the month from SML5E for our first Australia-Sweden 432 MHz contact, made on 30/7/78."

Thanks, Lyle, for the continuing receipt of the EME information. I will always be pleased to hear from any other EME operators in VK, and would be interested to hear how you have been getting on with your EME experiments. It is very nice to hear from anyone else but Lyle, and it would spread the interest further to know what others are doing.

FIELD DAYS

You are reminded again of the ZL Field Day for VHF, on 4/12/78 0400 to 1000Z and 5/12 1800 to 2400Z. All bands will be in use. Although I have not received confirmation, it is probable VK5 will hold a VHF Field Day period at the same time as the ZL Field Day. So those in other States and New Zealand could safely look this way at that time. I feel the December issue of AR will probably be out too late for further reminders so you will need to start your preparations after reading this. I certainly hope to go out with 52, 144, 146 and 432 MHz equipment and using one of my favourite hills.

From an operational standpoint, this month seems to have been very quiet, no one has written. There have been several reasonable openings on 144 MHz during the month to MI, Gambia and over the border to VK3 from VK5 Adelaide and precincts area, but very little else. With some possible 6 metre openings just around the corner, there may be more to write about next month.

Closing with the thought for the month: These days there is more happening on the screen of a drive-in movie than in the car!

The Voice in the Hills

LARA

Ladies Amateur Radio Association

This month LARA contributes — on a serious note — some details of organisation taking place within the ranks.

On the 5th November the LARA VK3 Annual General Meeting will be held so that all the office LARs can report on the busy time each has been having over the past year and what actually got done. The new office bearers will be elected. All willing workers are warmly invited to show up and join in the fun. New or prospective members are, of course, welcomed and have the opportunity of meeting other YLs interested in a common topic. . . . (amateur radio, naturally).

To recover from all this solemnity and formal procedure, LARA VK3 is holding one of its famous

foxhunts (or as purists insist — vixen-hunts). This will be a Sunday afternoon event held on the 6th of November, so try to cram it into the calendar amongst all the conventions, field days and hamfests which are cluttering up the horizon for weeks to come.

For those who have never attended a foxhunt, it is really simple. We present a set of Easy Instructions to the Beginner:

First unwind a couple of wire coathangers (as everyone knows these are bred from safety pins, but are easily available at the dry cleaner — just get your mind done early). Then wind them up into something vaguely directional. Hang a deaf receiver off the end and then put a car round the receiver and yourself. OM, kids, dog, cat and/or budgerigar are of course optional extras. The one essential object is of course a superb street directory. LARA foxhunts are generally happy friendly affairs where the only important competitive feature is turning up at the finish before the chocolate cake is all gone. So trundle along and join in. Don't be daunted by the Neound Sophisticate with her/his complicated aerial farm on the roof of the Land Rover or whatever, with automated, motorised, computerised, polished, dustproofed, waterproofed, chrome-plated double overhead beam-swinger, and accessories such as roo-bars and water bags. These are, we point out, totally unnecessary (unless you forget the street directory!).

On the national scene, LARA is still active. The regular HF skeds are a very good way of keeping our fairly small groups in touch with one another, and provide an incentive to the would-be YL full-calls. YLs in each of the active State groups are sitting for exams or doing classes in preparation. Many of us acquire an interest in the field gradually and then face the rather bewildering task of picking up a great deal of knowledge, starting from scratch. However, encouragement is there for all who need it and joining a LARA group is often all the extra incentive a would-be operator needs. So plunge on, all ye faint-hearted and we'll see you in the February exam. ■

AROUND THE TRADE

One of the features of trading of a new company in the electronics field is that of a "send no money" policy.

The company is Electronics Enthusiasts Emporium, Shops 2 and 3, Post Office Arcade, Joyce Street, Puddle Hill, NSW. Phone (02) 636 8222.

Where OTHR, simply order by mail or phone and pay on invoice. No charges, no post/pack and no 50g. ■

YRCS

Bob Guthrie/berlet

31 Bandon Terrace,
Marino, 5049

With the passing of Postal Motion 75.20.01 a Federal YRCS Constitution has been laid to rest. For those unable to understand the full meaning of this decision by a majority of State WIA Divisions, the interpretation is that the 1972 YRCS Constitution has been discharged and all Federal YRCS Officers are now unconstituted.

I have consulted the dictionary to discover the meaning of "swansong" and to my grief it involves a rather morbid reference to a last or dying song, in allusion to the ancient belief that the swan sings a last song before dying. Although my feathers are somewhat ruffled by this form no longer has the grace of a swan, I assure those who read this my last message as Federal YRCS Co-ordinator that the Chief Chief has not called me to publish my demise.

Many of the YRCS yams we have been through in YRCS activities — constitutions have been formulated, pondered over, objected to, disintegrated, and now finally the last has been well and truly laid to rest. However, it has been worthwhile, and the Scheme continues to function despite the upheaval in fact and circumstances. It is the true spirit of amateur radio. Should any reader suspect that I have been deposed from office, let

me assure you that I recommended the postal vote and uphold the decision.

An encouraging feature of the present is the understanding by WIA Divisions to encourage the Scheme Statewide, and I would express my thanks to the Councilors at the last Federal WIA Convention for their understanding of our problems and their willingness to co-operate with YRCS.

This swansong would not be complete without reference being made to Mr. Peter Dodd, who during the term of office has been a tower of strength. He has sympathised with me, encouraged and upheld me, and with courteous advice has offered me screwdrivers to unscrew the inscrutable, and made it possible for me to exercise an office in the interests of today's youth.

Ye feathers have flown, but I still have a few quills, and more important still, a sense of humour.

To you all, I say thank you — the swansong has ended, but may the melody of YRCS linger on. 73's, Bob Guthrie/berlet. ■

20 YEARS AGO

Ron Fisher, VK3OM

NOVEMBER 1956

EMERGENCY. Amateurs in Ocean Yacht Rescue. So read the heading of an enthralling article in the November 1956 issue of Amateur Radio. The rescue of the yacht "Yasme" and the part played by wide-scattered Amateurs was not only of interest to Amateurs themselves, but also to the public as well through several newspaper articles. The Yasme, skippered by Danny Well VK9TW/MM, was en route from Guadalcanal to Port Moresby when it was disabled by storm conditions. Port Moresby Amateurs, amongst others, helped "Sea Rescue Operations" who finally towed the Yasme to safety.

Back on the home front, the Editorial page was concerned with the ever present problem of "Pirates". One paragraph unfortunately seems even more applicable today than perhaps it did twenty years ago. "Today in the field of Amateur Radio we have pirates who advertise their presence by using bad language, poor operating procedure and discussing questionable subjects. Unfortunately some of these traits are not restricted to pirates but apply to some licensed Amateurs".

Technical articles included, VHF Field Strength Indicator Receiver, by Hans Ruckert VK2AOU. Its application was to track down harmonic radiation from amateur transmitters causing TVI.

Part three of Ian Barwick's VK3ALZ "Pulse Theory" article discussed the production of saw-tooth waves.

Two other articles reproduced from overseas magazines were, The Tesla Oscillator, and Wide-Range Tone Control in Amateur Phone.

Advertised for the first time in Amateur Radio was the Panda Globemaster 3-Band Minibeam. Designed by G4ZU, this must have been the first commercially available 10/15/20 metre beam in the world. The price incidentally was just under \$100.00. ■

IARU NEWS

JARL GOLDEN JUBILEE

An stated last month an original shield was prepared and presented to JARL by Mr Michael Owen, VK3KI on behalf of the WIA. A photograph and caption about this are included in this issue.

A study of the agenda for WARC 78 (see WIA NEWS herein for other details) indicates that the Conference will review and, where necessary, revise the radio regulations relating to definitions, frequency allocations and associated systems, the work of the IFRB and associated systems and Articles 12 to 20 dealing with interference and general administrative provisions for stations. Several other agenda items relate to specific matters unlikely to have any special interest to amateurs except one which refers to resolutions and recommendations for adoption.

The above will obviously be more than sufficient for 10 weeks work and it is noted that various other regulations are excluded such as those which deal with what amateur stations may or may not

do. It is a little difficult to see whether or not the limitations in the Agenda are likely to affect all aspects of a particular subject. For example, space seems to be dealt with under Article 7 which is on the agenda, but harmful interference caused by amateur satellites in RRI567A appears to be excluded.

As part of the annual returns by member societies, the IARU asked if any funding assistance is rendered by Society's governments. All societies replied affirmatively showing levels of support ranging from 3 per cent to 100 per cent of society's budgets. Generally the contributions were made in recognition of the technical training provided by the amateur society.

It appears that the UK is also in the grip of CB-fever which has resulted in the RSGB forming views about it. It should be remembered in this context that there is no 11 metre amateur band allocation in Region 1 including the UK.

Like the WIA, the RSGB exists to safeguard the interests of its members and of the amateur service in its own country. It is pointed out that the amateur service is a defined service internationally with world-wide status but a citizens band facility exists only where national administration sees aside spectrum space for the purpose.

The Society constitutionally would have no direct interest in a CB facility but believes it must take heed of any developments likely to affect the Amateur Service. One major consideration regarding any new facility is the ability of the administration to exercise complete and effective control.

Whilst it is not opposed to the introduction of a short range personal communications facility as long as it fits its place in the spectrum and the equipment used are suitable, it believes the 27 MHz band is probably one of the most unsuitable frequency bands that could be envisaged because of proximity to the amateur 28 MHz band, long distance propagation during part of the sunspot cycle and interference to TV receivers. Naturally, the location of a CB band within an amateur allocation was unacceptable and such new facility should be located remote from any amateur band to prevent illegal operation in an amateur band as is being experienced in the USA. ■

WARC LOVES NON-MEMBERS!

AWARDS COLUMN

Brian Austin, VK5CA

IARU REGION 1 AWARD

General:

- The award is available to licensed amateurs and shortwave listeners (on a "heard" basis).
- Contacts after November 1945 are valid.
- Applicants in the UK must submit their GSL card, or other written evidence to RSGB, applicants in other countries should submit list certified by the Awards Manager of an IARU affiliated society.
- Contacts must be made from the same call area, or where no call area exists, then from the same country. Contacts made from the National Field Day are NOT valid for the award.
- The award is issued free to members of RSGB. The fee for other applicants is 35p, \$1 or 8 IRC.
- The address for applications is:

Mr. C. R. Emery G5GH
"Warbury End",
Finners, Buckinghamshire,
England.

Rules: Extra countries may be added to the list of IARU members from time to time and these will be announced in Radio Communication. Requirements:

Class 2 — Confirmed contacts are required with 20 member countries.
Class 1 — Confirmed contacts are required with ALL member countries.

Country List:

Algeria	Luxembourg
Austria	Malta
Belgium	Mauritius
Bulgaria	Monaco
Cyprus	Netherlands
Czechoslovakia	Nigeria

Denmark	Norway
Germany	Poland
Faeroes	Portugal
Finland	Rhodesia
France	Romania
Ghana	S. Africa
Greece	Spain
Hungary	Sweden
Iceland	Switzerland
Ireland	Tanzania
Israel	Uganda
Italy	United Kingdom
Ivory Coast	USSR
Kenya	Yugoslavia
Lebanon	Zambia
Liberia	

RSGB COMMONWEALTH SERIES

General:

1. The World British Commonwealth, British Commonwealth Radio Transmision Award and the Commonwealth DX Certificate are available to licensed amateurs. The British Commonwealth Radio Reception Award is available to shortwave listeners.

2. Contacts after November 1945 are valid.

3. Applicants in the UK must submit their QSL cards to the RSGB HF Awards Manager. Amateurs outside the UK should submit a list, certified by the Awards Manager of an IARU affiliated society.

4. All contacts must be made from the same call area, or where no call area exists from the same country.

5. The awards are issued free to members of RSGB. The fee for non members is 35p, \$1 or 8 IRC.

6. The address for applications is:

Mr. C. R. Emery G5GH
"Westbury End",
Finmere
Buckinghamshire, England.

Note: Cards from countries which have left the Commonwealth are valid up to the time of their leaving and the dates are indicated in the call area list.

Rules: Cards from National Field Day contacts are NOT valid.

Requirements:

WBC — One confirmed contact is required from each of the 5 continents, with North and South America being counted as one continent.

BCTA — Confirmed contacts are required with 50 of the call areas on the list.

CDXC — Confirmed contacts are required with 50 of the listed call areas on the 14 MHz band and with 50 call areas on any or all of the amateur bands with the exception of 14 MHz. The call areas on the "other bands" do not have to be the same as the call areas on the 14 MHz band. For members of RSGB only a label badge is available with CDXC for a fee of 35p but this is not obligatory.

CCRA — Confirmations are required from 50 of the call areas on the list.

*Should all correspondents please include a SASE.

is an amateur band receiver covering the 80 to 10 metre bands plus the 15 MHz and 27 MHz bands in 500 kHz segments. They are of very attractive design and employ VFO tuning that has linear calibrations over the 500 kHz range in one kHz steps. Additional features include 25 and 100 kHz calibrator and a Q-Multiplier. Provision is made for the reception of USB or LSB with a crystal controlled BFO as well as AM with or without a noise limiter. The SX190, which incidentally has not been available at the half price rate, is identical except that the coverage includes several of the popular short wave broadcast bands in place of the 15 and 10 metre amateur bands. For those who would like to know more about these receivers, a complete review appeared in the May 1972 issue of CQ Magazine.

Well, so far so good, they appear to offer everything that is needed. However a few problems arise. Sideband reception is far from satisfactory due to several factors. Firstly the product detector produces a high degree of distortion and then the AGC action is too fast. Next in line is that only one degree of selectivity is provided which of course must be a compromise for both SSB and AM. With the 4 kHz band pass, unwanted sideband rejection is almost non-existent, and unfortunately the rather poor Q-Multiplier does little to help. On the credit side, stability, sensitivity and calibration are first rate. So far as the problems are concerned, I will be looking into some of them over the next few weeks and if all goes well should have something for you in the next months issue. I would of course be pleased to hear from readers who have delved into the works themselves.

NOW ON TO THE FT75B

Ian Berwick VK3ALZ has provided the following information to increase the drive on SSB with this unit.

The drive on my unit was inadequate on 80 and 40 metres. When all exciter coils were peaked up on one frequency, drive at that point was OK, but fell away rapidly elsewhere on that band. On 20 metres and above, drive was OK for about half the width of the band.

To increase drive proceed as follows:

(a) Disconnect D305 from the terminal labelled TX-RX. Leave the other end of D305 connected to the board.

(b) Extend the pigtail of D305 by soldering on a piece of wire one inch long. This is then soldered to the terminal adjacent to terminal labelled BM out. This unlabelled terminal in fact connects to the hot side of L201 secondary.

Now listen with a monitor and with the FT75B connected to a dummy load, adjust VR202 (carrier balance) for minimum carrier.

Drive should now be more than adequate on all bands.

IMPROVED AUDIO FOR THE FT200

The received audio of the FT200 has always been the subject of some criticism. Laurie Middleton VK3AW has come up with a simple modification to improve the product detector linearity.

Four new components are needed, 1 220K, 1 270 ohm, 1 10K and 1 560K ohm all ½ watt carbon resistors.

Now proceed as follows. Unsolder and remove R110 (100K) and replace it with a 220K ohm resistor. Unsolder and remove L106 from the cathode of V102a the product detector and replace it with a 270 ohm resistor. Unsolder and remove R112 (100K) and replace it with a 10K ohm resistor. Finally connect a 560K ohm resistor between pin 7 of V102 (product detector) and the junction of R126, R127 and R128. The modification is now complete.

Laurie also adds that the audio of the FT200 can be further improved by replacing the original speaker in the power supply unit with a Rola Plessey 3 x 5, 8 ohm unit.

NEWCOMERS NOTEBOOK

Rodney Champness, VK3UG
David Down, VK5HP

MILITARY SURPLUS VALVES — what value is that?

Often, the newcomer to the hobby becomes the recipient of a 'mystery bag' of components etc., can't wait to get them home to see exactly what the new acquisition is composed of, only to be confronted with components such as valves which bear military markings only, and because the newcomer has no access to the further identification of such markings, the components are put aside to gather dust.

In actual fact, IF the newcomer had the supplementary information required, no doubt a lot of the valves could be put to good use in various projects.

Here then is a list of some of these valves which crop up from time to time, but for comprehensive coverage of this subject, the reader is referred to the publication "Military Surplus Valves and their equivalents" by Babani. VK5 HP.

Military

Notation	Equivalents
CV 138	Z77, EF91, 6AM6, M8083
CV 2103	DF73
CV 491	ECC83, 12AXT
CV 372	3C45
CV 4009	5749, 5BA6W
CV 850	EF95, 6AK5
CV 136	N77, EL91, 6AM5, 8082
CV 138	Z77, EF91, 6AM6, M8083
CV 4018	PL5727, M8204
CV 4014	M8083
CV 4031	M8081
CV 4024	6201, ECC81, 12AT7WA
CV 455	ECC81, 12AT7
CV 4031	M8081
CV 493	EZ90, 6CX4
CV 858	6J6, ECC91
CV 2127	EL821, 6CH6
CV 2103	DF73
CV 492	ECC83, 12AX7
CV 133	6C4, EC90
CV 4003	M8136, 6169, 12AU7A
CV 1136	EF54
CV 4025	5726, E91AA, M8079
CV 4004	M8137

COMMERCIAL KINKS

Ron Fisher, VK3OM

3 Fairview Ave.,
Glen Waverley, 3159

This month a look at three different pieces of equipment, the FT75B, our old friend the FT200 and a new one, the Realistic AX/SX190.

A letter from a reader of this column prompted a look at the AX190, and as many of these sets have recently come on to the market at half the normal retail price it seems certain that many amateurs would have purchased one as a spare receiver for the shack. For those who are not familiar with the receiver, a short description might be in order. The AX190

Latest addition to
the YAESU line —

FT-221R

2 METRE ADVANCED TECHNOLOGY

inc. mic.,
AC & DC
power cable
and Acc plugs

SPECIAL

PRICE \$569

FEATURES

Operates All Modes

The FT-221R features all mode operation, SSB (LSB, USB), CW, FM, and AM.

Plug-in Modules

Yaesu engineering overcame and succeeded in its toughest assignment adopting plug-in modules for VHF. It permits orderly arrangement of the circuit boards, simplified service and alignment, while assuring unsurpassed stability.

All Solid-State Transceiver

Guarantees trouble-free operation. All circuits are fully transistorized with IC's and FET's for increased reliability.

Instant operation immediately after power on provides tremendous convenience for mobile operation with minimum power consumption.

Excellent Crossmodulation and Intermodulation Characteristics

The double tuning system, employing varactor diodes in the front-end, provides optimum selectivity and improved crossmodulation characteristics needed in today's active 2 meter band.

Rugged Power Stage

The newly developed 2N5591 or equivalent power transistor exhibits extremely high linearity and power dissipation (70W) delivering super stable power output on all modes, under any condition.

PLL System

The local oscillator employs the phase lock loop (PLL) with its fundamental oscillating in the 130MHz range, which eliminates spurious radiation and guarantees clean signal output. In reception, the PLL rejects all unwanted interferences.

Dual Tuning Mechanism

The FT-221R is equipped with a precision built dual vernier mechanism consisting of one control that provides bandspread tuning over a 16kHz segment of the band per turn, and the other provides tuning over a 100kHz segment per turn.

This assures precise tuning as well as fast tuning as needed for quick QSY.

88 Fixed Channel

In mobile operation, fixed crystal controlled channel may be preferred. The FT-221R accepts total of 11 crystals, 11 channel per band segment over 4MHz bandwidth.

Versatile Clarifier Control

The clarifier control is capable of varying either receive frequency only or both receive and transmit frequencies simultaneously allowing 4kHz on either side of the frequency.

This provides for great flexibility in "NET" operation.

FM Center-meter

The meter functions as an S meter in receive mode as well as a relative power output meter in the transmit mode. It also functions as a zero center indicator for FM discriminator on receive.

This allows perfect tuning of the receive station.

Built-in 100kHz Calibrator

The 100kHz marker assures calibration of the tuning scale for the most accurate frequency readout.

AC/DC Capability

The FT-221R can be operated on AC or a 13.5V DC car or boat battery supply simply by inserting the proper power plug to the power receptacle on the rear panel.

Compact and Wide Versatility

The FT-221R is a precision built, compact, high performance "feature-packed" transceiver offering Noise Blanker (SSB, CW, AM), Squelch (FM), Sidetone, Break-in CW and VOX for discerning 2 meter enthusiasts.

Repeater Offset Capability

Repeater operation is possible in the 146MHz and 147MHz bands. The repeater frequency is shifted, ± 600 kHz or an optional shift frequency at Normal and Reverse positions of the repeater switch.

TECHNICAL DATA

GENERAL

Frequency Range

144.0 ~ 144.5 MHz 146.0 ~ 146.5 MHz
144.5 ~ 145.0 MHz 146.5 ~ 147.0 MHz
145.0 ~ 145.5 MHz 147.0 ~ 147.5 MHz
145.5 ~ 146.0 MHz 147.5 ~ 148.0 MHz

Frequency Readout

Better than 1 kHz

Emission

SSB (LSB or USB selectable),
AM, FM and CW.

Power output

SSB 12 Watts PEP
FM, CW 14 Watts
AM 2.5 Watts

Frequency Stability

Within 100 Hz during any 30 minute
period after warm up.
Not more than 20 Hz with a 10%
line voltage variation.

Antenna Impedance

50 ohms unbalanced

Repeater Split

600 kHz and any frequency up to 1 MHz

Power Requirement

AC 100/110/117/200/220/234 volts
50/60 Hz
DC +12 ~ 14.5 Volts, negative ground

Power Consumption

AC Receive 30VA
Transmit 90VA at 10 watts output
DC Receive 0.6A
Transmit 3A at 10 watts output

Size

280(W) x 125(H) x 295(D) mm

Weight

Approx. 8.5 kg

RECEIVER

Sensitivity

SSB/CW 0.5 μ V for 10 dB S/N
FM 0.75 μ V for 20 dB OS
AM 1.0 μ V for 10 dB S/N

Selectivity

SSB/CW/AM 2.4 kHz at 6 dB
4.1 kHz at 60 dB
FM ± 6 kHz at 6 dB
 ± 12 kHz at 60 dB

Spurious Response

Better than 1 μ V at antenna input

Speaker Impedance

4 ohms

Audio Output

2 Watts at 10% distortion

TRANSMITTER

Audio Response

300 ~ 2700 Hz ± 3 dB

Carrier Suppression

40 dB or better

Unwanted Sideband Suppression

40 dB or better at 1 kHz

Spurious Radiation

Down 60 dB or better

FM Deviation

Maximum 12 kHz: Factory set at ± 5 kHz

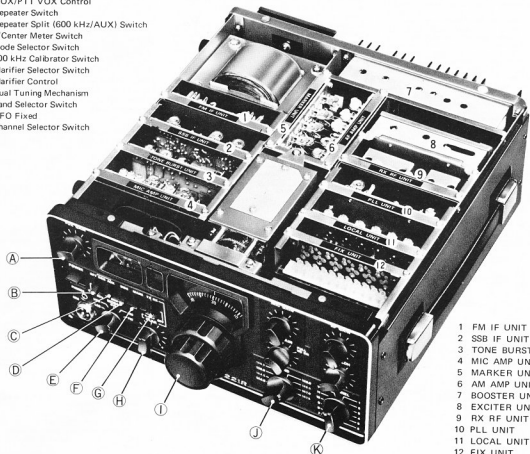
Repeater crystal provided.

ALL MODE TRANSCEIVER WITH PHASE LOCK LOOP (PLL)

— from Yaesu Musen Co. of Japan

Here is a compact, versatile transceiver designed for the active 2 metre enthusiast. The FT-221R features all mode operation — SSB/FM/CW/AM — with repeater offset capability. Advanced phase lock loop circuitry offers unsurpassed stability and clean spurious free signals. Modular, computer type construction offers reliability and ease of service. Pre-set pass band tuning provides the optimum selectivity and performance needed on today's active 2 metre band. Join the fun on FM, DX, or OSCAR, with the FT-221R transceiver. Another winner from the world's leader in amateur communications equipment.

- A MOX/PTT VOX Control
- B Repeater Switch
- C Repeater Split (600 kHz/AUX) Switch
- D S/Center Meter Switch
- E Mode Selector Switch
- F 100 kHz Calibrator Switch
- G Clarifier Selector Switch
- H Clarifier Control
- I Dual Tuning Mechanism
- J Band Selector Switch
- K VFO Fixed Channel Selector Switch



- 1 FM IF UNIT
- 2 SSB IF UNIT
- 3 TONE BURST UNIT
- 4 MIC AMP UNIT
- 5 MARKER UNIT
- 6 AM AMP UNIT
- 7 BOOSTER UNIT
- 8 EXCITER UNIT
- 9 RX RF UNIT
- 10 PLL UNIT
- 11 LOCAL UNIT
- 12 FIX UNIT

All prices include S.T. Freight extra. Prices and specifications subject to change.

90 DAY WARRANTY



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Radio amateur equipment from B.E.S. also sold by:—

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S.A.	FARMERS RADIO PTY. LTD., 20 Stanley St., Plympton, 5038	Ph. 293 2155
TAS.	G.T. ELECTRONICS, 131 Westbury Rd., South Launceston, 7200	Ph. 44 4473
N.S.W.	Aviation Tooling, STEPHEN KÜHL, 104 Robey St., Mascot, 2020	Ph. 667 1650 AH 371 5445
	Amateur & Novice Comm. Supplies, W. E. BRODIE, 23 Dalray Street, Seven Hills, 2147	Ph. 624 2691
	DIGITRONICS, 166 Parry St., Newcastle West, 2302	Ph. 69 2040
	H. C. BARLOW, 92 Charles St., Aitkenvale, Townsville, 4814	Ph. 79 8179
	MITCHELL RADIO CO., 59 Albion Rd., Albion, 4010	Ph. 57 6830
Q.L.D.	QUICKTRONIC, Jim Bland, Shop 11, Altree Crt., Phillip, 2605	Ph. 81 2624 82 2864
A.C.T.		

PROJECT AUSTRALIS

David Hull, VK3ZDH

Effective 1 October, 1976, all AO-7 mode B orbits which fall on GMT Mondays will be designated as QRP orbits as was done during mid June, 1976. The success of the three day QRP test has prompted these extra QRP orbits and it is hoped that users of the AMSAT-OSCAR 7 mode B transponder will reduce their signals to the recommended TEN WATTS effective radiated power during these orbits. The use of lower power is also highly recommended during other AMSAT-OSCAR satellite passes because of the beneficial effect it has on the battery. As AO-7 grows older its battery is deteriorating, and this deterioration is accelerated by users running higher power than is being recommended by AMSAT, that is 100 watts effective radiated power. This 100 watts ERP MAXIMUM is enough power to produce very readable signals from horizon to horizon with a small antenna and the average 144 MHz receiving setup. If mode B users can not hear the 100 WATT ERP signal at all times during a pass of AO-7 they should look at their receiving system and should NOT raise their power in order to hear themselves. With co-operation from all users the AMSAT-OSCAR 7 communication satellite will provide service for the worldwide radio amateur community for years to come.

DECEMBER 1976 OSCAR 6

Date	Time	Long	Orbit	Date	Time	Long
1	18876	00.45 84.70	1	9350	00.35 58.69	
2	18888	00.46 69.70	2	9363	01.29 72.31	
3	18901	01.41 83.45	3	9375	00.28 57.19	
4	18913	00.40 68.45	4	9388	01.23 70.81	
5	18926	01.35 82.20	5	9400	02.22 54.19	
6	18938	00.35 67.20	6	9413	01.16 69.31	
7	18951	01.30 80.95	7	9425	00.16 54.19	
8	18963	00.30 65.95	8	9438	01.10 67.81	
9	18976	01.25 79.70	9	9450	00.09 52.69	
10	18988	00.25 64.70	10	9463	00.03 66.31	
11	19001	01.20 78.45	11	9475	00.03 61.19	
12	19013	00.20 63.45	12	9488	00.57 64.81	
13	19026	01.15 77.20	13	9501	01.51 78.43	
14	19038	00.15 62.20	14	9513	00.51 63.31	
15	19051	01.10 75.95	15	9526	01.45 76.93	
16	19063	00.10 60.95	16	9538	00.44 61.81	
17	19076	01.05 74.70	17	9551	00.39 59.43	
18	19088	00.04 59.70	18	9563	00.38 60.31	
19	19101	00.59 73.45	19	9576	01.32 73.93	
20	19114	01.54 87.20	20	9588	00.31 58.81	
21	19126	00.54 72.20	21	9601	01.26 72.43	
22	19139	01.49 85.95	22	9613	00.25 57.31	
23	19151	00.49 70.95	23	9626	01.19 70.93	
24	19164	01.44 84.70	24	9638	00.19 55.81	
25	19176	00.44 69.70	25	9651	01.13 69.43	
26	19189	01.39 83.45	26	9663	00.12 54.31	
27	19201	00.39 68.45	27	9676	01.07 67.93	
28	19214	01.34 82.20	28	9688	00.06 52.81	
29	19226	00.34 67.20	29	9701	01.00 66.43	
30	19239	01.29 80.95	30	9714	01.54 80.05	
31	19251	00.28 65.95	31	9726	00.54 64.93	

LOCAL MODE B NOTES

(With grateful thanks to VK3ZBB)

After a protracted break I returned to Melbourne to find activity on Oscar 7 Mode B continuing with additional stations on the air.

The following new calls have been heard to date (12 September):

VK3BH, VK3JVL, VK4XQ, VK5EU, ZL4JW, ZL1TAB, ZL1TMS, AA6SC/KGE.

AA6SC is in Guam and puts a good signal into Oscar for the last 5 minutes of suitable orbits around AN190. He has worked most VK stations which have been active at the appropriate time.

While in Hong Kong, I spoke with Malcolm VSGHI. He complains that too many VKs call CQ Oscar without a listening break — with a 2 minute opening, calls must be very brief! Malcolm has heard VK7s on both modes A and B and is looking forward to a contact with them.

Barry ZL3AR is at present in Ramatonga with Stewart ZL1AA and is hoping to get him operating on 70 cm — we look forward to a new country before long.

Thanks again, Bob. Would anyone care to do a similar job to Bob's for Oscar 6 and 7 mode A. Bi- or tri-monthly would be appreciated. Please contact me. ■

REPEATERS

Ken Jewell, VK3ZNJ
Peter Mill, VK3ZPP

Since the 70cm band plan was finalised, the interest is hotting up. The primary and secondary repeater channels are or will be in use in NSW and Vic, by Christmas.

Most States appear to have their own different simplex channel. Is there any activity on the primary simplex channel 438 MHz? This information would be of use to interstate travellers.

FEDERAL NEWS

KVHF has been asked by FRC to co-ordinate the compiling of an Australian Repeater Directory for publication. All information for George should be sent c/- the Federal Office to save postage.

ACT:

The second repeater for VK1 has been granted a

NSW REPEATERS

CALLSIGN	Ch.	LOCATION OR SERVICE AREA
VK3RAO	42	Orange/Mt. Canobolas
VK2BOR	43	Port Macquarie/Transit Hill
VK2RAJ	43	Gosford/Central Coast
VK2RWG	43	Wagga/Mt. Flakney
VK2RLE	44	St. George/Sydney
	44	Lismore
VK2AMW	45	Wollongong/Ilwarrara Area
VK2RAM	45	Newcastle/Lower Hunter River
VK2RBV	46	Waverley/Sydney
VK2RAS	46	Dural/Sydney

ACT REPEATERS

VK1RAC	46	Canberra/Mt. Majura
VK1RGI	47	Canberra Area/Mt. Ginini

LETTERS TO THE EDITOR

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publishers.

The Editor,

Dear Sir,

I feel I owe an explanation to the many stations I normally enjoy a contact with in the Remembrance Day contest. I am sorry I missed you this year but decided to make a protest to draw attention to the plight of country stations participating in this contest under the present rules.

The RD is my favourite contest and I have participated as long as I can remember. Records will show my score has always been the top.

As I pointed out to the Contest Committee last year the new rules 5c, and 5d, are discriminatory against both country stations and stations in the smaller Ham States. Rule 5e was bad enough, but I thought, if a good idea to get the VHF boys in to the contest; with the increase in VHF operation, and especially the widespread use of nets, the continuation under these rules makes it something else.

It would be stupid of me to complain about offering some suggestions. Therefore I propose the complete elimination of rules 5c, 5d, and a new section to include novice operators and those unrestricted licensees who wish to work VHF only, this of course as a substitution for rule 5f.

One final thing, I'll be back next year whether the rules are fair or not. If nobody backs me up the RD is too important to miss, and I'll have to accept the fact that I am a voice in the wilderness.

Yours sincerely,

Brian J. Warman VK5BI.

Dear Sir,

My 2-metre rig when purchased, contained ten Simplex channels which, when jiggled around, produced channels 40 and 50, repeaters 1, 2, 3, 4 and 6. I also had half of channel 5. From the remaining crystals I could produce four anti-repeater channels and a couple of obscure simplex channels. (Note: I have no complaint about my rig or the supply of crystals with it).

licence. It will be sited on Mt. Ginini using Ch 7. NSW:

From Sid Ward VK2SW, details of the Wagga repeater VK2RWG: it is on Ch. 3 and located at a DCA repeater site on Mt. Flakney, 10 miles south-east of Wagga. The equipment is basically a Philips — TCA 1877 hybrid base. Power output after the cavity is 25 watts. The aerials are gamma fed half-wave dipoles with 15 feet separation on the side of the tower. The average mobile coverage is 50 miles in most directions, and the Wagga group extends a cordial invitation to all builders in the area to drop in on Ch. 3 Wagga.

VICTORIA

The Albion/Wodonga N-E Victorian repeater site on Mt. Big Ben has been completed. The equipment has already been tested in Wangaratta, 50 miles in the area keep an ear on Ch. 8.

The Tx of the Mt. Macedon Repeater (Ch. 5) has been tested on site, and there is no interference to existing equipment. A licence has been granted to a group in Melbourne to operate an experimental repeater VK3RAD, at Doncaster, using the primary channel 435.525/438.525. The mobile service repeater for Melbourne on Mt. Dandenong (Olinde) will use one of the secondary channels 433.675/438.675.

TYPE OF IDENT.	RANGE	PROJECT OFF.
Verbal	160 km	VK2ZKN
MCW	65 km	VK2ZHE
MCW	100 km	VK2ZRG
MCW	85 km	VK2ZSW
MCW	—	VK2ZSA
MCW	120 km	VK2AGV
MCW	140 km	—
MCW	100 km	VK2ZBX
MCW	80 km	VK2ZIM
MCW	100 km	VK1EP
MCW	—	—

At this stage I see no use for the anti-repeater channels and have yet to find anyone to talk to on the obscure channels.

This leaves me with a box of ten crystals in my desk drawer.

Based on my own experience, and, after asking around the contacts on 2 metres and HF bands, I find many other amateurs in exactly the same state — furthermore, they are willing to donate their spare crystals to a central bureau.

It was this response plus the willing help of my many contacts that helped me formulate a few proposed guidelines for such a bureau.

1. Crystals donated to the bank would be sorted in types and frequencies and recorded.

2. Popular types (or Multi-7, IC 22A etc.) would be listed separately and advertised in "Hamads" at frequent times.

3. Special sets of channels for use in 2L or VK would be set aside for hire by amateurs visiting these countries.

4. Stations donating crystals and not requiring any in return could be given a credit note on a basis of two for one of the same type for future use.

5. Straight exchange — one for one plus postage.

6. Purchases — say two dollars plus (or including postage).

7. Bulk-Buying — to supply cheaper crystals for new or changed channels (quite a saving is envisaged here).

8. Novices would be specially catered for as would the rapidly growing suburban clubs.

9. Any small profit made after expenses of postage and packing could be donated to State or Federal bodies.

The above are really first thoughts on the subject. However, if the idea is considered worthy of further investigation, either on a State or Federal level, I would be willing to start such a bureau and build it into a potentially valuable asset to our hobby.

Yours sincerely,

Les Kinch VK2BBD,
128A Borealle Road,
Duffry Forest, 3234A,
Phone 450-2526, Home.

Dear Sir,

WHAT'S WRONG WITH EXAMS?

With one lot of exam results being distributed, and whilst on the eve of the August AOCOP exam, one reads and hears much about the exam system, individual questions and, of course, the method of marking and result notifying. We read and hear too, how all the knowledgeable (?) people among us, suggest we hand over the exams to this institution or that institution, BUT, I wonder how many of us REALLY know the significance and importance of exams, and with this in mind, allow me to help you look at some objective investigations into the exam system:

1. The following people have scored zero marks for their examinations, and were overall school failures:

Albert Einstein, Winston Churchill, L. Tolstoy, Robert Clive, Emile Zola, Thomas Edison, Verdi, Gauguin, Col. Nasser, Napoleon Bonaparte.

2. A decade or so ago, ten completed exam papers of a trial Leaving Certificate paper were duplicated with ALL errors intact, and six experienced teachers were asked to mark them.

Each of these markers had been teaching the subject concerned, History, for that entire year.

What were the results? Not two rankings of the papers were marked the same. One marker failed 2 students, four markers failed 3, and another failed 5. The teacher who had marked the papers originally had failed only 1.

Too small a number of cases? . . . Too insignificant to be worthwhile? . . . Perhaps this is so.

Let us then look at a more comprehensive study: At Sydney University, between 1942 and 1947, an investigation was carried out concerning the value of the essay type answer and its reliability;

and we must remember that the AOCOP examination still requires answers of this type.

The procedure was as follows: 30 students' essays were printed out and submitted to 450 markers, teachers and undergraduates, who were asked to rank them in order of merit. The essays were considered to cover quite a range from very poor to excellent.

Here briefly, are some of the results:

20 of the 30 essays received ratings of both FIRST and LAST, the smallest range of any essay was first and twenty-seventh.

One particularly poor piece of work which was rated absolutely last by 164 judges, still received a number of high ratings including one "BEST". On the other hand, one particularly good effort, rated first by 200 markers, still rated poorly by some markers, including some "SECOND LASTS".

BUT WORSE IS TO COME . . .

Some months later, the same markers were asked to rank the same essays again.

The second ratings might well have been done by a different race of people; in fact, four of the essays that were placed last on the first occasion, were now placed first by the same assessors.

4. In 1951, in the USA, a Geography paper was set for 116 schools, and the results ranged from 20 per cent to 92 per cent.

In 1962, the same worked papers were marked by six examiners. The first examiner simply wrote out a model paper with all the correct answers, but accidentally left it in with the students' work. The other five examiners did not recognise it as such, and awarded it marks ranging from FORTY to NINETY per cent!

5. When one thinks of remarking, one cannot help wondering what would our results be if we always marked our papers again. Such subjectivity in

marking, led to the evolution of the so-called "objective test", in which answers are given usually in one word.

Perhaps you are familiar with the "multiple choice" and "true/false" type of test currently in widespread use (compare with the Novice AOCOP). This certainly removes subjective assessment and makes a compilation easier, but it allowed to become another form of "pressure" examination, or the end of education, it is perhaps even more damaging than the other form, for it must surely be destructive of initiative creativity, and the satisfaction and worth of learning at depth.

Further to this, as recently as a year ago, one prominent radio company in Australia used a "multiple choice" type paper in its Personnel department, for the purpose of being able to rapidly assess the prospective employee's standard of electronic knowledge. Some bright executive within decided to assess the ASSESSING paper, and arranged for the typist to answer the questions with the relevant tick or cross. This she did, unobserved and under examination conditions, and merely by random answer selection, she managed 63 per cent.

6. To summarise: all types of examinations have value. It is the manner in which they are used in so many quarters that they become highly questionable.

Many methods should be used in evaluation, but without pressure, without threat, and continuously through any course of study. The wider the variety the better . . . oral and written questions, observation discussion and for the purposes of any AOCOP examination, surely a PRACTICAL exam, have their place.

David S. Down VK5HP.

IONOSPHERIC PREDICTIONS

Len Poynter, VK3ZGP

Having recently gained access to some of the HF bands with a "N" call, was able to take a closer look at the conditions prevailing prior to, and following a geomagnetic storm.

IPS had issued a warning for Sept. 18 and my own charts showed a possible recurring storm around that date, so a closer look was taken from the 17th onwards.

Around 0300Z on 18th, ZLs on 7 MHz were reporting auroral type signals indicating to them a disturbance. Local VK K figures show the disturbance commencing between 03-0600 GMT whilst VK6 put the time at 0400Z. The first noticeable effect was not felt until the 20th when IPS reported the A index as 40.

Detailed K reading up to 19th Sept. (latest available at the time of writing) were:

Time (GMT): 0-3 3-6 6-9 9-12 12-15 15-18 18-21 21-24
date
18/9 2 4 4 6 5 2 1 2 A-28
19/9 2 2 2 4 5 4 5 3 A-26
from Mundaring WA with commencement at 0400Z 18/9. This was the strongest I have recorded since last May.

The sunspot-running smoothed is still on the decline.

Figures for 1975 now read: 1/75 — 23; 2/75 — 22; 3/75 — 21; 4/75 — 19; 5/75 — 17; 6/75 — 16; 7/75 — 15; 8/75 — 14; 9/75 — 14; 10/75 — 16; 12/75 — 17; and 1/76 — 16.

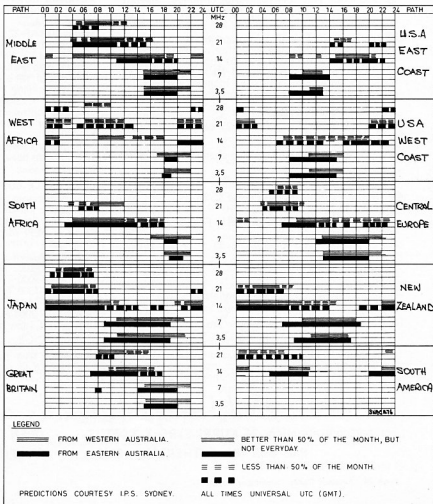
Monthly means for 1976 read: Jan. — 8.5; Feb. — 4.6; Mar. — 23; Apr. — 19.5; May — 12.7; Jun. — 12.4; Jul. — 2.1.

Of the 213 days for 1976, 76 produced no visible spots. The highest daily count was 51 on 19 and 20/3/76.

The latest projected running smoothed numbers: November 4, December 3, January 1977 3. If these numbers are to fail, the only conclusion is that of very low monthly means to at least the middle of 1977.

Since Cycle 20 began in October 1964 it reached its peak in November 1968, 4 years and it is still declining after 8 years. So its period will be in excess of 12 years, longer than the average 11.1 years.

It looks like communication satellites for the next 40 years if the experts are correct.



PREDICTIONS COURTESY I.P.S. SYDNEY.

ALL TIMES UNIVERSAL UTC (GMT).

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PETER SCHULZ, VK2ZXL.

ROSS HULL VHF/UHF MEMORIAL CONTEST

RULES 1976-77

The Wireless Institute of Australia invites Amateurs and Short Wave Listeners to join in this annual contest which is held to perpetuate the memory of Ross Hull, who did so much to further VHF/UHF.

A Perpetual Trophy is awarded annually for competition between members of the Wireless Institute of Australia and is inscribed with some details of the man the contest honours.

The name of the winning member of the Wireless Institute of Australia for each year is inscribed upon the trophy and that member also receives a suitably inscribed certificate.

Objects: Amateurs from Australia and Territories will endeavour to contact as many other Amateurs as possible under the following conditions:

Date of Contest: 11th December 1976, 0001 GMT to 16th January 1977 2400 GMT.

Duration: Any seven calendar days within the dates mentioned above which need not be consecutive. These periods are at the operators' convenience. A calendar day is from 0001 GMT (1001 EAST) to 2400 GMT (1000 EAST).

RULES

1. There are two Divisions, one of 48 hours duration and the other of seven days duration. In the seven day division there are four sections:

- (a) Transmitting Open
- (b) Transmitting Phone
- (c) Transmitting CW
- (d) Receiving Open

An open log is one where points are claimed for more than one mode, i.e. Phone, CW, RTTY, ATV, SSTV. (AM, FM and SSB are grouped together as Phone).

In the 48 hour division, the best score over any consecutive 48 hour period is the winner.

In the seven day division the best score over any seven days of the contest is the winner.

2. Any Amateur operating fixed, mobile, or portable within the terms of his licence may participate.

3. All Amateur VHF/UHF bands may be used, but crossband contacts are not acceptable. At one time, single frequency operating only is permitted. Cross mode contacts are permitted.

4. Amateurs may enter for any one of the sections and either or both divisions. The seven day winner is not eligible for the 48 hour award.

5. Two contacts per band per day, irrespective of mode are permitted provided that at least two hours elapse from the previous contact with that station on that band.

6. Logs from a multi operator station are not acceptable. One operator only may operate a station at any one time, and must submit a log for his own operation.

7. Entrants must operate within the terms of their licences.

8. The exchange of RS or RST reports with a serial number starting at 001 and advancing by one for each successive contact, will be proof of contact.

9. Entries should be set out on Quarto sheets, using one side of the paper only, and must be forwarded to reach the Federal Contest Manager, Wireless Institute of Australia, Box 67, East Melbourne, 3002, in time for the last opening of logs on Friday 18th February. Envelopes should be clearly marked Ross Hull Contest. Early logs will be appreciated.

10. Scoring will be based on the following table:

All bands — Contacts within own call area — 2 points
All bands — Contacts with other call areas — 10 points

Bonus Points: Each new call area contacted, 50 points, once only per band per day (including own call area). In addition, 1 point per valid contact made during the contest to be added to the final seven day score.

Operation via active repeaters or translators is not permitted for scoring purposes.

11. Logs should be set out as in the example and must carry a front sheet showing the following information:

Name
Address

Section

Call sign

Claimed 7 day score

Operating dates

Highest 48 hour score

Operating period

Declaration—I hereby certify that I have operated in accordance with the rules and spirit of the contest.

Comments.

12. All times to be logged in GMT only.

13. Certificates will be awarded to contestants who break any VHF/UHF record during the contest.

The VK contestant who returns the highest score in the transmitting section and who is a member of the WIA will have his name inscribed on the trophy which will be held by his Division for the prescribed period.

A certificate will be awarded to the operator with the highest 48 hour score.

RECEIVING SECTION

1. Short Wave Listeners only may enter for this section.

EXAMPLE OF A VK3 TRANSMITTING LOG

Date/Time	Band	MHz	Emission	Call sign	RST Sent	RST Received	Points	Bonus
Dec 19	52		SSB	VK4DT	59001	55037	10	50
0207	52		CW	VK4XA	569002	579012	10	—
0212	144		SSB	VK7ZAH	58003	58026	10	50
0216	144		SSB	VK3ZBB	58004	59042	2	50
0327	432		FM	VK3AUU	56005	56018	2	50

EXAMPLE OF A VK8 SWL RECEIVING LOG

Date/Time	Band	MHz	Call Heard	RST Sent	Station called	Points	Bonus
Jan 2							
1146	52		VK5ZXD	58087	VK6BK	10	50
1207	52		VK2ZDD	56244	VK60K	10	50
1400	432		VK6JX	57061	VK6TG	2	50
1815	144		VK6RF	47004	VK6ZDQ	10	50
2309	52		VK2ZAY	56143	VK6XY	10	—

CONTESTS

Kevin Phillips, VK3AUQ

Box 67, East Melbourne, 3002

CONTEST CALENDAR

Nov 8/7	RSGB 7 Mhz Phone
9/10	YLRL Anniv. Phone
13/14	Deltaware GSO Party
13/14	Missouri GSO Party
13/14	European RTTY Contest
20/21	Australian 160 Contest
27/28	CQ WW DX CW
Dec. 1/1	
Jan 16	Ross Hull VHF Memorial

REMEMBRANCE DAY CONTEST

I have not finished compiling the list of placings as yet, so the results will not appear until next month. At the time of writing about 840 logs have been received, quite a few with comments both in favour and against the present rules. Comments generally favour a change to the whole structure of the rules to even up the chances of all Divisions of winning. Many operators found the contest friendly though. I will comment further after all the logs have been processed. Thanks to all who participated and sent in logs.

ROSS HULL VHF/UHF MEMORIAL

There have been a few changes to the rules for this year's contest and comments would be appreciated on them. The biggest change is to the scoring, which was fairly time consuming and complicated.

The old scoring table has been replaced with a much simpler scoring system, where your own call area counts 2 points and other call areas count 10 points.

Bonus points are awarded for each new call area worked on each band each day. One point

2. Contest times and logging of stations will be the same as the transmitting section except that there will not be a 48 hour Division.

3. Logs must show the call sign of the calling station, the serial number given, and only the call sign of the other station. Scoring will be as for transmitting stations.

4. Any scoring contacts may be logged. There is no limit to the number of times that a station may be logged provided that serial numbers are given.

5. The logs for any seven days may be submitted and the winner of the section will be the highest scorer.

6. Certificates will be awarded to the highest scorer in the contest, and if sufficient interest is shown, to state winners.

7. A certificate will be awarded to the club station with the highest 7 day score.

General—It is preferable that complete logs be submitted as an aid to checking, but contestants must clearly show their best 7 days or 48 hours. Enjoy yourself in another friendly contest, and try to exchange names with each contact.

per contact added to the final seven day score is to encourage activity throughout the contest.

Time will also be in GMT only, as the old system was a bit hard to work out, and not many people are on EAST at this time of year. Daylight saving is in force in most States, and anyway, GMT with EAST days is a ludicrous idea.

I hope the changes will be for the better, and will encourage greater participation. Most changes came about as a result of past comments on the contest. See you in the contest, I hope. ■

BOOK REVIEW

ARRL ELECTRONICS DATA BOOK

This data book is the first collection of useful data by the ARRL. The data collection is a worthy addition to the range of ARRL books. The book consists of an interesting collection of tables, nomographs, graphs, circuits and other useful information.

A great deal of data from many sources has been concentrated in this book. The volume and range of data make it a very useful addition to both the hamshack and the office bookshelf.

In a few places the American origin of the data book is evident, but the amount of USA-only data is minimal. This compares more than favourably with data collections compiled in other countries.

A well thought out and well presented collection of data. ■

QSP

STATISTICS AGAIN!

Based on latest statistics available, it is estimated that there are 364 million television sets in the world, compared with 360 million telephones and 300 million automobiles and trucks". ITU Telecommunication Journal, June 76.

INTRUDER WATCH

All Channel, VK3LCL

1536 Hie Street, Glen Iris, 3146

Of recent months a mysterious noise has been consistently reported occupying the 14 MHz band. It has been described as a sound like a "vickers machine gun" and like a "slow wood pecker". No matter how it is described as, it has been identified, for it is heard world wide. A recent letter from my contemporary G3PSM says "Subject Pulse transmission — During the past month a pulse transmission has been causing severe harmful interference in the 20 metre band, centred on 14215 MHz. This transmission has been identified as a four channel P9 (pulse) emanating from a site in the area of Poltava in the Ukraine. Emission analysis shows the pulse to be an exact square wave. As far as can be established, representations to Moscow have been made by the Federal Republic of Germany, Norway, Sweden and the United Kingdom. It is anticipated that should this transmission continue, other administrations will take the appropriate action". A VK4 observer further describes it, and I quote, "I am writing about an intruder in the 20 metre band which totally blanks out the entire band making it useless for even local communication. The signal is a popping noise somewhat like a slow wood pecker, the noise blanking has no effect. The signal strength is usually 20 to 40 dB over 9 and it is not on any one frequency". In a further letter he says "Since my letter last week about the popping noise some new information has come to hand. While leading the trail on a DJ station last month, I learned of the source of the noise. It is coming from the USSR and appears to be intentional. According to the German station, the Russians have three transmitters going, one for the low end of the band, one for the middle and the third for the top end of the band. One of these is located at Minsk. They are each transmitting a sweeping signal which traverses its range many times per second, thus causing the popping sound and that is why the noise blander has no effect. This would also explain why the interference is worst when the band is open to Europe. He said that complaints to the USSR Government had no effect, and that they (the German equivalent of our intruder watch) had many tapes of the interference. One action they were recommending be taken in Europe was to refuse to work Russian AM stations, until such intentions were removed, and tell them why. I heard an OH station doing just that this past week-end.

One last bit of info, he claimed that of the 200 or so intruders in the 20 metre band 90 per cent were in Russia! How about that, the Russians are sabotaging our bands, hi!

MAGAZINE INDEX

Syd Clark, VK3ASG

Sometimes the unexpected happens; readers will remember that in 1975, Bill VK3ABR led a party on an expedition to Lake Eyre. Although that trip was successful, some aims remained to be achieved and so Bill planned to return to the lake during the August/September School holidays in 1976. Since the "law of Murphy" operates just as effectively in respect of such expeditions as in other matters a week before departure Bill found himself short of starters. A quick whip round was made and Ron VK3OM and Syd VK3ASG joined the party of fourteen who went away for fifteen eventful days with loads of fun, some sailing, some Amateur Radio and some problems.

Now, back to the "Magazine Index".
BREAK-IN July 1976
 NZART Golden Jubilee Celebration, Auckland 1976; The Early Days, New Zealand-U.S.A.; Wireless Telegraphy in New Zealand.
CQ MAGAZINE April 1976
 DXing from Deception Island; A New Look at Helically Loaded Antennas; 1975 CQ World Wide DX

Contest Claimed Scores; Cheap and Easy Bandspread for the SP-60-JX Receiver; A One Once External Oscillator for the FT-101-E; Armed Forces Day Tests; A Simple Kilowatt; The Prolonged Sunspot Minimum and its Implications with Respect to Future Sunspot Activity; Feeding Multi-Band Antennas; An Early Report on USA-WPX-75.

HAM RADIO June 1976
 Stable VFO Design; RTTY Time/Date Printout; Survey of FM Detectors; New Audio Speech Processing Technique; Improved Selectivity for Collins S-Line Receivers; Linearity Meter for SSB Amplifiers; Improved Transmitter Keying; Circuits & Techniques; Frequency Readout for Collins S-Line; Receiver Trouble Shooting; Time-Out Warning Indicator; Microprocessors.

HAM RADIO July 1976
 Modern Design of Frequency Synthesizers; Wind Generator Characteristics and Installation Techniques; How to add an Inverted V or Delta Loop to Your Tower; Five Frequency Receiver for VHF; Pocket Transistor Tester; Integrated Circuit Base-Step Generator; Readout Display for Two-Meter Digital Synthesizers; Matching Techniques for VHF/UHF Antennas; Carrier-Operated Relay for Repeater Linking; Microcomputer Interfacing.

QST June 1976
 Helical Resonator Design Techniques; Your Radio Signal — Short May it Wave; Linear Loaded 20 Metre to 10 Metre; Learning to Work with Integrated Circuits, Part 6: NBS — Ears for Your Ham-Band Receivers; His Eminence — The Receiver, Part 1; CER-verites; Odyssey; Joint-Effort Communications Development; Terremoto — Ayuda.

RADIO COMMUNICATION July 1976
 Some New Insights into the Mechanism of the Sunspot Cycle; Learning About Logic; A Transistorized Low-Scan Television Monitor; A Simple Solid-State 1.3 GHz Converter and Tripler; A 10-80m Aerial Tuning Unit; The Interference Survey.

RADIO COMMUNICATION August 1976
 A VFO for Use with a Trio 2200G; The Suppression of Television Timebase Interference; Semi-Vertical Trap Aerial for 1.3, 3.5 and 7 MHz; Solid State IC202 Frequency Meter; Calculation of Distances from QRA Locators; Codes; Under the Hood; Review of Icom IC202 Hand-Held 2m SSB Transceiver; Learning about Logic.

SHORTWAVE MAGAZINE May 1976
 Operational Amplifiers; Some Receiver Improvements; Intelligence; Oscar, Where Art Thou?

SHORTWAVE MAGAZINE June 1976
 The IC-202 SSB/CW Two-Metre Transceiver; How to Raise a Ventriloquist; Simple Active Filter; Multi-Range DC Millivoltmeter; Indicator Quad for Two Metres; The Contest Power Unit; Useful Timing Circuit.

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- QTHR means the advertiser's name and address are correct in the current WIA Radio Amateurs Call Book.

FOR SALE

AM TX: Globe Scout 65, DX-40, CW TX: EICO 720. All complete, working to 50W, but 110V AC supply required, transistorised RX 0.5-170 MHz, ATV home brew connector with preamp. Prices \$50 to \$25. VK3ABR, QTHR, Ph. (03) 314 6743.

BC221, built-in AC power supply, \$20. VK3QW, QTHR, Ph. (03) 560 6545.

3 Bedroom Home in Ryde (Sydney), complete with TH800X up 75 feet and guys forming inverted V for 80 and dipole for 40, Tilt-over system. House has huge family room (air conditioned), two toilets, lock-up accommodation for 4 cars, large workshop etc. Available early 1977. VK2ABR, QTHR, Ph. (02) 85 1101.

UHF Base Station, boards setting up, \$60. Teletype punches, \$5.00. Boards for solid state video, RTTY. VK3BDB, QTHR, Ph. (03) 58 7441.

SILENT KEYS

It is with deep regret that we record the passing of —

Mr. T. W. A. HALLEY VK4TI
 Mr. J. GEORGEON VK2AKU
 Mr. P. L. LEMPIERRE VK3ALL

Lindenow 5/8 2 Mx Mobile Whip, fibreglass, heavy duty, \$15.00. VK3UV, QTHR, Ph. (03) 90 6424 evenings.

Yaesu FLDX 400 Transmitter, in perfect order \$250. VK3BW Portlanning, QTHR, Ph. (052) 59 2322.

Tower in 12' spigotted sections 18" x 18" triangular construction, climbing rungs, hot dipped galvanneal, in eight sections, construction, constructed, designed for up to 80' and high wind velocities, excellent condition, \$960. VK2AAK, QTHR.

Akai XIV tape recorder, stereo and mono, battery or power, four speeds 15/16 to 7 1/2, runs 16 hrs. on 5" spool at 15/16, 4 track, 4W stereo output, portable, crossfield head, \$150. VK2AAK, QTHR.

Telecom low loss helical membrane cable, imported, 100', 2.8 dB at 1000 MC, new, \$50; NP 108 lifting for above type N, 2 only, \$35. VK2AAK, QTHR.

Parks Converters 144/28 MHz, \$24; 432/28 MHz, \$50; VHF Assoc. Converter 1296/28 MHz, \$ Varactor triplers, imported 144/432 (40W input), \$432/1296, \$24. VK2AAK, QTHR.

QSTs back to 1950, practically complete, wish to sell as a set, 50c each or offer, VK2AAK, QTHR.

VHF 2m amplifier, 2 x 1500B blown; as per APRIL Hand. 1967 p. 453, with regulated screen, bias and filament, fully metered, 3000V 50 mA, Varic controlled solid state supply. Suitable for high power 2m moon beacon. \$420. VK2AAK, QTHR.

FT200 Transceiver, complete with power supply, mic and handbook, in mint condition, in original case, very little use, all bands work well, \$375. VK2GJ, QTHR.

Varic, Warburton Franki, adjustable auto transformer, 0.265V, 9A, 30c; power supply and modulator, pair 866As and pair 609s, Class B, \$30. K. Moore VK3ASM, QTHR, Ph. (03) 754 4194.

FRDX500 160-10m 2W/6m with FM, \$240; 50 ft. 5 section mast C/W rigging kit, \$50; 12 ft. yagi, 70 cms, 10 ft. 8 ft. 2m, 1/5, 5 ft. 6m, \$20; RF-U 10-16 MHz, 15-28 L/V 35-50, \$25; 70 cms PA 6W RF 1/P, 150W DC 1/P 4X2K20m fan cooled with PSU, \$120. VK3ZFO, QTHR, Ph. (03) 718 2364.

6 year-old Quality Textured Brick Veneer House, on new estate, beside suburb (Aspendale), 20 sqs., 3 beds., BIRs, ensuite, ultra modern kitchen (plenty cupboards), large lounge and dinette, huge rumpus room 14 sqs., incorporating shack, and suitable table tennis, billiards, etc., garage, wood shop, above ground pool, high brick fence in front, courtyard, schools, shops, kinder, station, beach, all within 5 mins., quiet location — plus 42 crank up/lift over lattice tower, 204BA, HAM '3V', 450 cms, 10 ft. 8 ft. 2m, 1/5, 5 ft. 6m, \$20; RF-U 10-16 MHz, 15-28 L/V 35-50, \$25; 70 cms PA 6W RF 1/P, 150W DC 1/P 4X2K20m fan cooled with PSU, \$120. VK3ZFO, QTHR, Ph. (03) 90 6424 evenings.

Yaesu FT2B FM Transceiver, 5 ch., mobile mount, mike and handbook, \$120. Scalar Magnabase and 2m whip, 155. 160M Table Top Linear 400W out, 22m. Lafayette H33 communications Rx with original packing and handbook, \$50. VK5AS, QTHR.

Linear Power Supply, 700/1400V, 250V, 210V, reg. sin., commercial case, plus 2x5146B linear and sundries, \$100. VK2SM, QTHR.

WANTED

Could any amateur in the Sandringham District be able to fix up for me a Lafayette HESB FM/AM which covers 145-175 MHz. Circuit can be supplied. Ph. (03) 598 1915 after 4.45 pm or any time week-ends. Barrie Boye L30425.

Circuits for transistorised vidicon TV cameras, suitable for ATV. Peter Williamson VK4ZPW/T, 3 Rebutal St., Soldier's Hill, Mt. Isa, 4825. Ph. (077) 45 055, ext. 27.

Donation of purchase of a figure "14" in 24 point Times Bold to small hand press donated to club. Please contact Townsville ARC PO Box 964, Townsville, 4810.

**DRAKE**

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DSR2 Digital readout communications **RECEIVER** 10 kHz-30 MHz continuous coverage, fully synthesised, for AM-USB-LSB-CW reception. **\$3495.**

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DC4 POWER SUPPLY for battery operation of TR4C or T4XC. **\$187.00.**

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